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The Practical Teacher

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Wisdom is humble that he knows no more.'—COWPER.

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COMING MEN.

I.—MR. T. A. ORGAN, B.A.

Clerk to the Law Department of the National Union of Teachers.

ONE finds him in the cosy Law-Room of the Union's house at 71, Russell Square, behind a table well bespread with 'cases,' and in the midst of walls lined with rows of legal tomes and shelves of legal portfolios. Of middle height, spare, wiry, alert, thoughtful, and tireless, Mr. Thomas Arthur Organ seems the very man for his post; and yet it is little more than a twelvemonth ago since he quitted the master's desk at school. For, like most of the officials of the N.U.T., the apprenticeship of teaching and honorary Union work formed Mr. Organ's path to other office. Born thirty-five years ago, in the little upland Cotswold village of Painswick, Gloucestershire, he went through the usual course of pupil-teachership at the national school. At the end of 1876 he took the Queen's Scholarship, and during 1877 and 1878 he passed the usual period of preparation at the Cheltenham Training College. But he distinguished himself there in more than one way; he won one of the College Exhibitions by his ability and indefatigability as a student, and he was also remarked for special aptitude in teaching—a combination rather rare. In those days, even, there were not wanting observers who foretold for him an ultimate success above the common, and 'Cheltenham' now looks upon him as one of her most distinguished sons. Steady, persistent, and culminating work *plus* special ability has been the secret of Mr. Organ's success. He did not waste his time as pupil teacher, and his college career was sufficiently brilliant to entitle him to 'a good berth' when leaving it. He could, therefore, pick his 'berth' to some extent, and with wisdom he chose to spend the next stage of his development in a city school. The London School Board accepted his application, and from 1879 to 1880 he was an assistant teacher at the Central Street School. He thus began his career under the Board in a rather unsavoury district, among rather a poor class of children. In 1881 he went to the Hargrave Park Road School, to teach children of a better class, and in 1885 he became an assistant teacher in the Vittoria Street Pupil Teacher School. For he had not ceased to study on leaving college. Steadily he had kept before him the possibility of better things, and during his assistantship he graduated in arts at Trinity College, Dublin. Those who know the cost of time and cash which graduation there entails will the better appreciate his persistency. Many a teacher now in the employ of the London School Board remembers with pleasure and esteem the kindly help of Mr. Organ, both in and out of duty hours, whilst he served at Vittoria Street, and later. Then came promotion to headmastership, promotion to a high-class school, the Board's great Higher Standard School at Medburn Street, St. Pancras. The repute of this school stood high, but under Mr. Organ it became more than local; during his mastership there he helped forward the formation of a science laboratory at the school, an art department, and a department for manual training; and when he left, in 1892, he had completed the arrangements to make the place an organized science school and art school under the Department of Science and Art. Thus in his school career he had steadily progressed and developed, from a school in a poor locality to one in better surroundings; from one in better surroundings to a pupil teacher school; and thence to the head-mastership of one of the best schools under the London Board. Persistency, industry, and timely qualification were the causes of this well-deserved success.

To many a man such work, so much of it, and such achievement, would have seemed enough; and for many a man no other work, concurrently, would have been possible. But all this time Mr. Organ had been busy in his leisure hours—those hours which most of us occupy in mere pleasure, instead of making them hours of changeful work, which in itself becomes a pleasure too. Soon after Mr. Organ came to London he began to take a share in public action; the meetings and the organizations for School Board elections and Parliamentary elections knew him well. He was not timid, and he always held strong views as to the right and duty of

BRITISH MUSEUM

teachers to enjoy and use the civil and national rights of Englishmen. At the London School Board election of 1885 he was secretary to the Committee which made such successful efforts in the Finsbury Division to return candidates pledged to progress and earnestness in the work of public education. He was never afraid *s'afficher;* he has dared to take strong lines in anything which he has taken up, and the usual reward of boldness leavened by tact has been his. But he by no means forgot his duty to his rank and profession. Early in his career as teacher he became a member of the National Union of Teachers. He attended the meetings regularly, even while a private member; and the criticisms and suggestions he made at such times soon marked him out for office as a prominent worker in the Finsbury and District Association. Mr. Organ is a man of ideas and initiative, and he speedily justified his appointment as Secretary of his Association. The officers and other prominent workers of the Finsbury Association would acknowledge that during Mr. Organ's secretaryship in 1887 and 1888 were laid the foundations of the enterprise which has made the Association the largest in the Union. In 1889 he continued the work as Vice-President, and in 1890 as President. But in 1888 he had taken upon himself duties of a wider and more comprehensive kind. At the conference of the N.U.T. that year he was elected a member of the Executive of the Union. Gratifying features of this election were that it took place at the first time of asking, and in the town where Mr. Organ's collegiate career had been passed. The successive elections which followed placed him year by year higher on the poll. Winning the respect of his colleagues of the Executive, he became Vice-Chairman, and then Chairman of the Law Committee, the latter one of the most onerous honorary posts in the Union. The illness of Mr. Heller in the last year of his office as Secretary of the Union made the work of the Chairman of the Law Committee more than ever severe; but for twelve months Mr. Organ discharged the duty alone, at the cost of yielding to it almost all the time not due to his work at school. The recognition of this self-sacrifice was not long delayed. For some years the project of appointing a special law official had been considered from time to time by the Executive; but, *inter alia*, the difficulty of obtaining a lawyer versed in educational affairs had stopped the way. But when, in 1891, it was found that Mr. Organ had entered himself as a student of the Inner Temple, and was qualifying for the bar (with the idea of obtaining an important School Board clerkship), it was seen by the Executive that not only the hour had come, but the man.

The resignation and retirement of Mr. Heller, together with the growth of the Union, had necessitated re-arrangements of staff. It was seen that the Parliamentary, press, and other public work of the new General Secretary, Mr. Yoxall, would necessitate more of devolution and of departmentalizing than had hitherto been the case in the central operations of the Union. A post as law official was almost necessarily created; and, applying for the post, Mr. Organ was appointed. As he told the Executive at the time, the change, according to the terms fixed, would mean pecuniary loss to him, but he was prepared to suffer that in view of the gain in years to come. So the change took place, and has justified itself over and over again in the interests of the Union; for there has been a positive and considerable economy and gain to the Legal Assistance Fund, and on the basis of £ *s. d.* alone the appointment of Mr. Organ has had good results. But beyond that there is the advantage of greater promptitude and fulness of treatment than was possible under former arrangements of the legal work of the Union. Mr. Girling, whose long and able connection with this work as Chairman of the Committee will be known to many readers, was firmly in favour of the appointment of a law clerk; and his opinion has been more than sustained by the result.

The legal operations of the National Union of Teachers have never been fully described, and are seldom fully understood. It is, perhaps, impossible to convey a comprehensive view of them, but the following quotations from the Union's report on 1892 may serve to elucidate the point:—

The Legal Work of the Union.

General.—There has been a decided increase in the work of the Law Committee during the past year. Part of this increase is the natural consequence of the influx of new members. The Committee during the past year has held eighteen meetings, and the average number of cases dealt with at each meeting has shown a steady increase. The following comparative table gives particulars which show a steady growth of work:—

Year.		Cases.		Letters.
1889	...	376	...	2,705
1890	...	373	...	2,768
1891	...	449	...	4,066
1892	...	776	...	5,017

Funds.—The following table gives certain particulars as to expenditure:—

Year.		Law Costs.		No. of Cases.		Average cost of each Case.
1890	...	£1,206	...	373	...	£3 4 0
1891	...	1,606	...	449	...	3 11 0
1892	...	1,008	...	776	...	1 5 7

On reference to the table it will be noted that during the past year there has been a remarkable diminution in the average cost of each case. This, in the opinion of the Executive, is attributable to the fact that the appointment of a separate law official, devoting the whole of his time to the work of the Legal Department, has enabled them to deal with this branch of their work more expeditiously, and consequently more economically.

Typical Cases.

Assault on Pupil.—A schoolmaster was fined for an assault on one of his pupils. The master had punished the boy for an offence committed after school hours, and off the school premises. The magistrates decided that, in their opinion, punishment for such an offence was illegal, and fined him accordingly. An appeal was made to the High Court, and was heard in the Divisional Court of Appeal. It was held that the magistrates were wrong on the point of law, and the case has been sent down to the Southampton Bench for reconsideration.

Illegal Dismissal.—(1.) In our last report we stated that the head teacher of a Board school had been charged with an indecent assault, and, as a consequence, had been dismissed by his Board. At the Assizes he was acquitted. Action was immediately taken in the High Court to recover damages for illegal dismissal. These damages to the amount of over £40 have been recovered, all the costs, in this case exceptionally heavy, of the proceedings falling on the Board in question.

(2.) A master having received notice of dismissal from the vicar of the parish, who claimed to be the sole manager, was instructed to resist the enforcement of such notice. Under the trust deed it was considered by the Law Committee that the vicar had no power of himself to give such notice. The Executive agreed to pay a sum equivalent to the salary the master had been receiving, and to commence proceedings for the purpose of restraining the vicar from carrying out the notice. An action in the High Court is pending in this case.

Slander.—(1.) A town councillor, in the course of an election speech, made certain statements with regard to the conduct of a schoolmaster in the same town. These statements having been

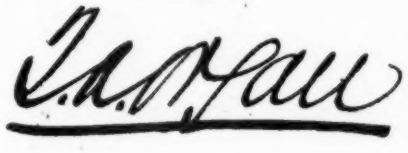
reported to the Executive, a writ was issued. When the case came on for hearing a compromise was effected, one of the terms being that the councillor withdrew all imputations against the master.

(2.) A curate in a country village had grossly slandered the schoolmaster. On being threatened with legal proceedings by the Union, the curate agreed to pay the sum of two guineas to the charitable funds, and admitted that the statement was unjustifiable, and unreservedly and unconditionally withdrew it. The text of the apology was published at the expense of the curate in the professional and local press.

Inquest.—A lad in the school of a member of the Union died, and an inquest was ordered to be held. At the first hearing the father alleged that the death had been caused by the effects of a blow which had been given by the master. The case was adjourned for the purpose of holding a post-mortem examination. The local practitioner asserted that it was his belief that tetanus was the cause of death, and that it had been induced by a blow. Special medical witnesses were engaged at a cost of thirty guineas. These witnesses supplied evidence which entirely overthrew that of the local practitioner, and as a result the master was acquitted.

Claim for Salary.—A master died, and his widow claimed from the managers of his schoo' a certain sum which she alleged was due to her as executrix of her late husband. The managers refused to pay this sum, but eventually, when they found that the Union was determined to take legal proceedings in the event of non-payment, they forwarded a cheque for £84 9s. 2d. in liquidation of the claim and costs.

Assault Cases.—To enumerate only the names and results of the cases falling under this head, including assaults *by* teachers and assaults *on* teachers, would occupy too much space. We would, however, record that during the past year a much larger number of cases than usual have been dealt with in which assistant teachers have been concerned. Only in a few exceptional cases has the client of the Union been unsuccessful.



The assaulting parent, the blackmailing parent, the defaulting manager, the slanderous manager, the libellous writer, the illegal dismisser, the false allegation, the secret charge, the dangerous busybody, are all dealt with on behalf of the Union member; and this work is done by the Law Committee and its clerk, acting under the authority of the Executive, and reporting its proceedings thereto, or occasionally taking instructions therefrom. The number of cases actually taken into Court hardly represents a tithe of the number that yearly come under the consideration of the Union; and all this means a mass of work with which few officials would care to try to cope.

Beyond this, however, extend the duties and operations of Mr. Organ. For several years before his change of avocation he had taken a lively interest in the question of 'Extraneous Tasks.' In conjunction with Mr. E. Gray (now the Vice-President of the Union) he prepared an exhaustive report on the subject; and a widely-noticed article on it from his pen soon afterwards appeared in the *Contemporary Review*. Since his change of avocation Mr. Organ has done much good work towards the solution of the problem of how to secure reasonable security of tenure. He fought the Wimblington School Board election, and he has prepared several statements of unjustifiable dismissals for the press. In all these ways he has gone far to affect public opinion in favour of justice to the teachers, both with regard to their duties and their hold upon their posts. So that, apart from the routine duties of his position, Mr. Organ discharges a great deal of work with regard to tenure and the imposition of non-scholastic tasks.

The man who qualifies *beforehand* is the man who succeeds, as a rule; it is not enough to see the opportunity when it arises; the opportunity must be recognized "while yet afar off." In the subject of this sketch we have an instance of the value of pre-qualification. Mr. Organ was one of the first of English certificated teachers to qualify himself for teaching the subject of manual training by a visit to Naäs; even in his holidays he pursued the work of educational qualification—in Sweden during the summer of 1888, in Oxford during the summer of 1889. When, a few months ago, the London County Council requested the Executive of the National Union of Teachers to nominate a representative on the Technical Education Board for London, this pre-qualification of Mr. Organ (like his pre-qualification on entering for the Bar) came into play; and it was seen that his experience in learning at Naäs and teaching at Medburn Street School especially fitted him to represent the Union ably on a Board of Technical Education. He was therefore nominated for the honorary and honourable post, and the nomination was by the London County Council unanimously confirmed.

But there is still another way in which Mr. Organ's capacity and activity for the cause of the Union have been displayed. He is joint editor of the N.U.T. Edition of the Code, and is responsible for the legal chapters and most of the business work arising from that publication. The first annual issue of the book has been a huge success, and there is reason to believe that the toil of the editors in connection with it will yearly result in a most handsome addition

to the general fund of the Union under the auspices of which and as the property of which, it is published.

Mr. Organ is only half-way on the road to the Psalmist's 'three-score years and ten,' but he is certainly 'a coming man,' who, to a large extent, has already 'arrived.' Before long he will be qualified as a barrister, and, health and strength permitting, will plead the cause of members of the Union in many a court. What else may lie before a man of such individuality and vigour is matter for a prophet to say; the present writer will not venture on the risky task of prediction. But there is one thing certain, that powers so distinguished, industry so great, and persistence so marked will carry him much farther yet. In the meantime, one may justly say that in Mr. Organ's career there is seen an example to be followed, a model to be imitated, and a continuous honourable deed of which to be proud.

PAPERS FOR PUPIL TEACHERS.

BY JOHN ADAMS, M.A., B.SC., F.C.P., ETC.
Principal, Free Church Training College, Aberdeen.

THE SOCRATIC METHOD.

EVERY pupil teacher has heard of the Socratic Method, but not one in a thousand knows what it means. Most teachers have got the idea that Socrates was a talkative old fellow who used to wander about Athens button-holing people, and boring them with endless questions. Hence the idea that the Socratic Method consists simply in asking questions—it was only the other day that I came across this precious bit of ignorance in a School Management Book: 'The Socratic Method, or the Method of Asking Questions.'

We need not plunge very deep into Greek Philosophy to discover that this is rank nonsense. Socrates was certainly continually asking questions, but so is every silly child; and we might with more show of reason call 'the Method of Asking Questions' the 'Nursery Method.' It is evident, all the same, that asking questions is an essential part of the Socratic Method, and we must now seek to find out how Socratic questions differ from others. There is a class of people called *Agnostics*, who go about the world saying that they don't know anything. Long ago people used to poke fun at them and say: 'Come, now, you do know something after all, for you know that you don't know anything.' So after that, when anybody asked an Agnostic whether he knew anything, the Agnostic did not say he didn't know, he just asked the question, 'What do I know?'

Now, Socrates was not an Agnostic, but, like the Agnostics, he was reduced to asking questions. He went about in a simple sort of way, pretending that he did not know this, that, and the other thing; and asking people to tell him all about it. Then, when people told him, he kept on asking did they mean this or did they mean that, until the poor people began to see that they didn't know so much as they thought. Then they began to see that they were very ignorant, and began to ask Socrates what *he* thought about what they were talking of; but catch Socrates *telling* them anything. He was just as afraid of telling them anything as a pupil-teacher is. He used to go about boasting that he never told anybody anything, but made folks find out everything for themselves. So when they asked him what *he* thought about anything he just kept on asking questions, till the people who asked him began to see for themselves what was the truth about the matter.

The aim of the Socratic method is always to get a correct definition. Socrates believed that a man never knew what he was talking about till he could give a correct definition of it. Most people go through the world talking about things they really do not know. Most pupil teachers, for example, would be very angry with me if I said they didn't know what an insect is. Yet I would be greatly surprised if more than one in a hundred pupil teachers could tell me what an insect really is.

Now, suppose Socrates could rise out of his two-and-a-half thousand year old grave (and could speak English), he would come along to the playground and quite carelessly say to John Thomson, the pupil-teacher:

'By the way, Thomson, what *is* an insect? I'm not quite sure, and I'd like to know, you know.'

Then Thomson would feel very big at being asked in that way by such an old man, and would answer, in an off-hand style:

'Oh, an insect? Why, I thought *everybody* knew that. An insect's—let me see—yes, an insect's a little animal with wings.'

Then Socrates would look over the school railings at a hen, pecking away among the stones in the road, and say:

'Well, well, now; so that's an insect. D'ye know, I wouldn't have thought that, now.'

And Thomson would be angry, and think that Socrates wasn't just such a nice old man as he had thought, and would go on to explain that a hen was far too big for an insect.

But Socrates would be quite nice about it, and say:

'So an insect is a *very small* animal, with wings?'

Th. (relieved). Yes.

Soc. Is a humming bird small enough?'

Th. (shortly). No; an insect isn't a bird at all.

Soc. Then an insect is a *very small* animal with wings, *that isn't a bird?*

Th. (again relieved). Yes.

Soc. In a shop, yesterday, I saw a little package marked Keating's Powder, which was said to kill all insects. There were some pictures of very small insects that weren't birds, but they hadn't wings, so I suppose it was a mistake putting them there, for they couldn't be insects without wings, could they?

(Thomson is now sure that Socrates is a very disagreeable old man, and wonders he didn't notice before what an ugly pug nose he has.)

Th. (bitterly). Yes, they're insects right enough. Everybody knows *them*. You don't mean to say you don't know them?

(Socrates never answers side questions like this last. He always keeps to the main point.)

Soc. Dear me! Dear me! What are we to say now? An insect is a *very small* animal with wings, *that isn't a bird*, and *sometimes hasn't wings?* Really I don't think I quite know yet what an insect is.

Th. (with a happy inspiration, and a memory of a reading lesson). Oh, an insect is an animal that begins as a grub, goes on to be a chrysalis, and ends by being a perfect butterfly.

Soc. How interesting! Now, how long would you say Keating's insects—the ones without wings, you know—would take to become perfect butterflies?

Th. Oh, bother! You do nothing but find fault. Tell me what an insect is—you.

Soc. But you forget, my dear Thomson, that I don't know. I'm only asking for information. Let's examine three or four animals that we know to be insects, and see wherein they resemble each other. Which animals shall we take?

Th. Oh, let's take the butterfly, the bee, the spider, and—and, say, the beetle.

Soc. Good; but, by the way, my friend the professor happened to say the other day that the spider isn't an insect, though, like you, I thought he was, and so do most people. Let's examine him along with those we are sure about, and see how he differs from them; that will help us to find out what an insect really is.

And so the conversation goes on. They find that the spider has eight legs, while all the genuine insects have only six; that all the insects are made up of a series of rings; that these rings are divided into three sets; that all have either wings or traces of wings, &c.

Examining this illustration, we find that Socrates' object is to obtain for the pupil (if we may call him so) a clear definition of the term 'insect.' This clear definition is always the aim of the Socratic method, only it need not be the definition of a concrete object as here, or of an abstract term (goodness, justice, government, &c.), as is the case with Socrates himself in actual practice. In the ordinary work of teaching, as the illustrations in our next article will make evident, the Socratic method is always employed to bring into clear light the full meaning of the idea under consideration.

So much for the aim: now for the method. Socrates always started with the assumption that the pupil knew all about the subject to be discussed. To this assumption the pupil cordially agrees. By drawing out the full meaning of the explanations offered by the pupil, a feeling of uncertainty is gradually instilled into his mind, culminating in the open confession of ignorance, and an appeal for help. The last part of the process is the leading of the mind thus prepared to answer its own questions. The three stages are:—

1. Certainty, with no foundation.
2. Doubt, with a spirit of inquiry.
3. Certainty, based on careful examination.

It is obvious that Socrates, or the teacher, is assumed to know accurately all the ground to be covered, and to know exactly the point to which the inquiry is to lead. In actual practice the Socratic dialogues sometimes finish without coming to any definite conclusion; but though this may be permitted in dealing with men, it is quite out of place in our school work. The teacher must know exactly the explanation up to which his questions lead.

This superior knowledge of Socrates, while he pretends to be asking for information, gives rise to what is called the 'Socratic Irony.' One cannot read Socrates' remarks in the beginning of the above dialogue without feeling that he is sneering at Thomson all the time he is questioning him. This is the one part of the Socratic method that is absolutely dangerous in the hands of an inexperienced teacher. Sarcasm is always dangerous in school, and this form is particularly so. I have frequently seen a class, after a few minutes of the 'Socratic Irony,' shut up as completely as any oyster. Not a word would any child say, for he knew that his answer was bound to be turned against him. With men the second part—the conviction of ignorance—is the most important; with children the last—the leading to the truth.

The irony is not essential to the method, and can be wisely dispensed with. Sufficient humour can be introduced into the lesson by the various contradictions which are continually emerging; and when the lesson is properly conducted these contradictions, so far from intimidating the children, lead them to eager and interested effort to meet and reconcile them.

Another danger of the method is the assumption that Socrates never tells anything, and that we, in our teaching, must also tell nothing. Now, there are two kinds of knowledge, one that comes from within and can be drawn out by questioning. We can call this knowledge *a priori* knowledge. The other kind can only come from without; no amount of questioning, however skilful, will draw it out. This kind of knowledge must be put in by 'telling.'

I do not know the Japanese word for a *tree*, and I am quite sure that if the cleverest teacher in the

world questioned me from now till Christmas he couldn't 'educe' it from me—so long as he asked fair questions, that is. Of course if he were to say, 'Now, isn't the Japanese word for tree *so-and-so*?' I might agree with him and say, 'Yes.' But no one could call that 'educing' or 'eliciting.'

Socrates himself, in his attempts to teach without ever telling anything, is sometimes not quite fair. For example, he says something like this: 'And if we call a figure that has four equal sides and four equal angles a square, you would say this is a square, wouldn't you?' Of course the pupil says 'Yes'; and Socrates turns to the onlookers and asks them to notice that he hasn't *told* anything to the pupil. But everybody knows that he has really *told* the pupil what a square is. There was no other way for it but to tell, and he ought to have told straight out.

This distinction between things that must be told and things that mustn't is of the greatest importance in teaching, and lies at the root of the whole science of questioning. Our next article will give one or two examples of the Socratic method applied to school work, and in these examples pupil-teachers can gather for themselves the true meaning and value of the two different kinds of knowledge. The examples will be followed by an article on the general principles of questioning from a pupil-teacher's point of view.

OUR PUPIL TEACHERS' COURSE.

I. General Remarks.

(*a*) We have received from the Education Department a copy of the new Form 8 I (s), which has been issued in compliance with the wishes of those Inspectors who desire to be freed from the congestion caused at the ordinary Pupil Teachers' Examinations.

Much confusion has recently arisen and some injustice been committed by the hurried examination of Pupil Teachers' Singing and Recitation and by the consequent inroad upon the time that should have been devoted to 'paper work.'

Now, an Inspector may at his option hold collective examinations at which the Singing and Recitation may be heard and the garments and specimens of needlework be shown. These examinations may be either half-yearly or quarterly, and may extend to those Fourth Year Pupil Teachers who will be Scholarship Candidates.

This circular points the moral that we are continually inculcating in season and out of season, viz., not to defer any portion of the year's work till the last moment. Any who thus defer the above-mentioned subjects may be suddenly found 'slumbering and sleeping.'

(*b*) The course of current events makes it advisable that the Geography of Siam and Tonquin and the facts connected with the Behring 'Seal-fishery' and the Newfoundland 'Cod-fishery' should be well known.

In connection with the first-named it should be noted that our Asiatic dominions or sphere of influence are now adjacent to those of two of the *Great European Powers*, viz., France and Russia. This fact adds immensely to our responsibilities.

The '*Seal-fishery*' controversy mainly relates to the 1,500 islands of the Alaskan archipelago. (*N.B. The Seal is not a fish.*) Alaska was formerly a portion of the Russian Empire, which Power had previously endeavoured to treat the Behring Sea as a *mare clausum* (a closed or territorial sea), but which promptly withdrew its flimsy claims before the determined representations of Great Britain.

However, in 1867 the United States purchased Alaska and its islands for one million pounds. Of course the territorial rights upon the mainland and the islands themselves and for the usual limits around the coasts were included in the bargain. But recently the Yankees have asserted their right to frame all the regulations relative to the '*Seal-fishery*,' and to make prize of any vessels contravening them. The subjects of Great Britain, especially the Canadians, have been much aggrieved thereby, especially as the Hudson's Bay Company had by long usage acquired a prescriptive right to fish in the seas adjacent to the islands, and as the assumption of dominion over the open waters is outrageously against international law.

Fortunately, arbitration, and not warfare, has been resorted to, and representatives of the two countries met in Paris in April last to argue the points at issue. Unfortunately, several of the documents cited by the United States were immediately discovered to be impudently garbled, and had forthwith to be withdrawn. The decision is not yet known; but it is to be hoped that our country will not be so glaringly over-reached as at the Alabama Arbitration. Probably, in the interests of seal preservation, some close season and other restrictions of capture will be mutually agreed upon.

The *Cod-fishery* dispute is a monument of the carelessness of our Treaty-Framers. For 180 years it has been a source of friction between England and France, although such great treaties as those of 1763 and 1815 might have settled the controversy for ever.

In 1713, by the Treaty of Utrecht, the French were expressly allowed to fish from Cape Ray to the Straits of Belleisle, and thence eastward to St. John's, and two small islands (St. Pierre and Miquelon) adjacent to the south coast of Newfoundland were granted to them for the purpose of conveniently curing their fish.

The treaty was, however, so carelessly compiled, that the French claim to possess exclusively the right to fish along the above-mentioned coasts, although they do not deny the English dominion there. At present there is only a *modus vivendi* obtaining—a merely temporary agreement.

There is not only a commercial but a political advantage accruing to France from this fishery. It is one of the greatest training-schools for their sailors.

II. Arithmetic.

(*a*) *Three ways of comparing vulgar fractions.*

(α) The ordinary method of reducing to L.C. Denominator.

(β) The method of reducing to L.C. Numerator, *e.g.*,
Compare $\frac{17}{23}$, $\frac{18}{23}$, $\frac{19}{23}$, $= \frac{68}{92}, \frac{69}{92}, \frac{92}{92}$.
The order of ascending magnitude ∴ is $\frac{68}{85}, \frac{69}{81}, \frac{92}{98}$, for it is evident that the smaller the divisor is the greater will be the fractional quotient.

(γ) The method of equal multiplications or divisions, *e.g.* :
Compare $\frac{35}{108}, \frac{41}{126}, \frac{38}{117}$.
Now, multiplying each fraction by 9 will not disturb their *relative* value—

$$\frac{315}{12}, \frac{11}{13}, \frac{342}{13}$$
$$= 2\frac{11}{12}, 2\frac{13}{12}, 2\frac{13}{13}.$$

Here it is evident that the ascending order of magnitude is

$$2\frac{11}{12}, 2\frac{13}{13}, 2\frac{13}{12},$$

∴ The ascending order of magnitude is

$$\frac{35}{108}, \frac{38}{117}, \frac{41}{126}.$$

This artifice is a very elegant one.

Note that if any number of fractions be arranged in ascending order of magnitude, that their reciprocals will be in descending order.

N.B. The reciprocal of any number, fractional or integral, is unity divided by that number.

(*b*) *Two catchy subtractions of measures.*

(α)

	pls.	yds.	ft.	ins.
	9	0	0	2
	7	5	2	11
		5	0	3

Here it will be seen that although there would apparently be at least *one* pole in the difference, there is none.

(β)

	sq. pls.	sq. yds.	sq. ft.	sq. ins.
	9	0	0	3
	7	30	8	143
		$29\frac{1}{2}$	0	4
	or,	29	4	76

The same remark applies as to (α) *supra*.

(*c*) *Relation between Debt and Present Worth, and Principal and Amount.*

(α) Any '*Amount*' sum in Interest can be at once transformed into a Present Worth sum, *e.g.* :—
Find the Amount of £300 for 4 years at 5 per cent.
Ans. £360.
Find the Present Worth of £360 due 4 years hence at 5 per cent. Ans. £300.

(β) In many Discount problems, the second and the third terms of the proportional statement may be with advantage changed, *e.g.* :—

Find the Discount on £60 6s. 4·8d. due 1½ years hence at 2⅔ per cent.

Interest on £100 for ⅔ years at ⅔ per cent = £4 ;
∴ Discount on £104 = £4
∴ As £104 : £60 6s. 4·8d. :: £4 : Discount ;
or, As £104 : £4 :: £60 6s. 4·8d. : Discount.

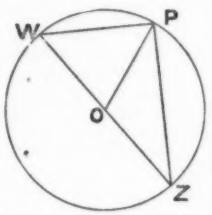
As 26 : £1

	£	s.	d.
26	60	6	4·8
	£2	6	4·8. Ans.

III. EUCLID.

(*a*) If any point in the circumference of a circle be taken, and thence lines be drawn to the extremity of any diameter, they shall contain a right angle.

Hints.—Join P to centre O.
Then WO, PO, ZO are all =, and
∧ OWP = ∧ OPW (1.5), and
∧ OZP = ∧ OPZ (1.5)
∴ ∧s OWP and OZP = ∧s OPW and OPZ
= ∧ WPZ
∴ WPZ is a right angle (1.32).—Q.E.D.



(*b*) *Axiom XII.* is often esteemed unaxiomatic, *i.e.*, too complex to be granted as a fundamental theorem.

It has been proposed to substitute the following :—

'Two lines which intersect cannot both be parallel to the same straight line' ; and then Prop. 1.29 would follow directly therefrom.

IV. MODEL ANSWERS TO GEOGRAPHY OF APRIL EXAMINATIONS.

BOYS AND GIRLS.—SECOND YEAR.

(*Answer three Questions only, including the last, if you can.*)

1. 'Europe is a continent of inland seas.' Name them, and the countries they wash. Note also the points of difference between the Baltic and Mediterranean.

Three mighty inland seas bathe Europe on the South, and three seas corresponding to them lave its shores on the North.

The three in the South are :—The *Caspian* Sea, which belongs partly to Europe and partly to Asia (Russia and Caucasia are on the West ; Persia on the South, Turkestan on the East).

The *Black* Sea (with seas of Azov and Marmora) has Russia on N. ; Caucasia on the E. ; Asia Minor on the S. ; Turkey on the W.

Mediterranean with Europe and Asia on the N. (Spain, France, Italy ; *Adriatic* Sea—Austria, Turkey, Greece ; *Ægean* Sea—Asia Minor) ; Palestine on the E. ; Africa on the S. (Egypt, Barca, Tripoli, Tunis, Algiers (Morocco).

The three in the North are :—The *White* Sea nearly surrounded by Russia.

The *Baltic* with Sweden on the W. and N. ; Finland and Russia on the N. and E. ; Germany on the S. ; Denmark on the W.

The *North* Sea with Scotland and England on the W. ; Belgium, Holland, Prussia on the S. ; Denmark and Norway on the E. (Irish Sea—Scotland, England, Wales, and Ireland.)

Baltic	and	*Mediterranean.*
	(A contrast.)	
1. Is shallow, with low shores.		1. Is deep, with lofty coasts.
2. Lies in a region of rains all the year through.		2. Lies in the region of autumn and winter rains.
3. Has numerous and large rivers feeding it.		3. Is fed by few rivers, compared with its great area.
4. Lies in a region of cold temperature and small evaporation (closed by ice from December to April).		4. Lies in a region of high temperature and great and rapid evaporation. (It is never closed.)
5. Has its level raised by rivers flowing into it.		5. Has its level lowered by water evaporated from it.
6. Has almost fresh water in some parts, ¼ as salt *as ocean.*		6. It water is salter than ocean-water.
7. Baltic always overflows and a current runs out of it into the North Sea.		7. Mediterranean is always deficient and a current is always running into it from the Atlantic.

2. (*a*) What are the chief exports of India ? (*b*) What goods does it take from us ?

(*a*) The exports in the 1st Class are : Grain, raw cotton, opium, oil and other seeds ; in the 2nd Class : Hides, jute, tea, indigo, rice, coffee.

After these come : Leather, sugar, spices, wood, silk.

(*b*) The imports from England are to the value of over £30,000,000, and chief amongst them are : Manufactured cotton, hardware and cutlery, manufactured silk, railway materials, machinery, woollen goods, liquors, coal.

3. Name the foreign possessions of two European Continental countries.

(*a*) The foreign possession of France are :—(1) In *Asia* : Pondicherry, Mahé, and other small stations in India, Cochin China, Cambodia, and Tonquin. The French are at present approaching Siam. *Anam* is under French protection.

(2) In *Africa* :—Algeria, Senegambia, The Gaboon, Ogowe, and Congo Territories, Bourbon, St. Marie, Obock.
(Suzerainty of Madagascar, Tunis, Comoro I.)

(3) In *America* :—Guadeloupe, F. Guiana, Martinique, Miquelon, and St. Pierre.

(4) In *Oceania* :—New Caledonia, Marquesas, Loyalty, Tahiti, Gambier Islands and other islands.

(*b*) The foreign possessions of *Russia* in Asia are Siberia, Russian Turkestan (including Trans-Caspian District, Bokhara, Khokan, Khiva), Transcaucasia, Saghalien, Kurile Islands.

4. Enumerate the productions of (*a*) Australia and (*b*) New Zealand, noting the colony or districts where they are severally produced.

(*a*) *Gold* is the chief production of Australia. *Victoria* has produced most (Ballarat, Sandhurst). Then *New South Wales* (Bathurst, Lachlan basin). *Queensland* (Gympie). South Australia and West Australia produce small quantities.

Tin in Victoria, New South Wales, Queensland (Grafton).

Copper in South Australia (Wallaroo, Burra-Burra, Kapunda), Queensland, New South Wales.

Silver in South Australia, Queensland.

Lead in Queensland, South Australia, New South Wales.

Coal in New South Wales (Newcastle, Maitland), Queensland.

Iron in Victoria.

Granite in Victoria, New South Wales, Queensland.

N. S. Wales.	Victoria.	Queensland.	S. Australia.	W. Australia.
Sheep, cattle, wool, hides, tallow, tobacco, wheat.	Wool, tallow, hides, skins, sheep.	Maize, sugar, cotton, arrowroot, coffee, tobacco, sheep, cattle, vine.	Wheat, vine, olive, fig, raisins.	Timber, wool.

Trees, *acacia eucalyptus.* Animals : Kangaroo, dingo, platypus, opossum, emu, cassowary, black swan.

(*b*) *New Zealand.*—The chief *gold* fields are near Nelson (S.I.), Hokitika (S.I.), and the Clutha (S.I.) *Coal* at Greymouth (S.I.). Silver and Antimony are also found.

Other productions are :—Sheep, wool, flax, barley, oats, wheat, cattle, timber, tallow ; animals (native) : apteryx, moa (now extinct).

5. (*a*) The captain of a ship makes it noon by the sextant, when by the ship's chronometer it is half-past 3 p.m. In what longitude is the ship ? (*b*) Show that degrees of longitude in different latitudes are of unequal length.

(*a*) The time being 3½ hours later than Greenwich time, he is (3½ hours L.) W. of Greenwich time.

But 12 hours = 180° therefore
1 hour = $\frac{180}{12}$
and 3½ hours = $15 \times \frac{7}{2} = \frac{105}{2}$.
= 52½° W.L.

(*b*) Longitude is distance E. or W. of any given Meridian drawn through the Poles. It is indicated by degrees (360° all round the globe, *i.e.*, 180° each way.) Now at the *Equator* there is a distance of 25,000 miles for these 360° ; *i.e.* about 69 miles to a degree. At the Poles there is a point for the 360° ; *i.e.* a degree measures nothing. ∴ the length from Equator to Pole gradually diminishes from 69 miles per degree to nothing. We find that at London 51½° N. lat. a degree of long. measures 42 miles.

6. Draw a map of France.
See any good atlas.

BOYS AND GIRLS.—THIRD YEAR.

(Answer three Questions, including the last, if you can.)

1. 'Asia throws out large offshoots on two of its sides; the gulfs which penetrate it are all the more valuable for commerce, inasmuch as great rivers flow into them.' Give as many instances as you can which will prove the above statements, and show that they prove them.

The two sides meant are the East and South coasts.

On the East coast the offshoots are: The peninsulas of *Tchuktchi*, *Khamschatka*, and *Corea*. The convexities are Eastern Siberia (Behring Sea, Sea of Khamschatka, Sea of Okotsk), *China* (Yellow Sea, Japan Sea, *East* Sea), Cochin China (*China* Sea, Gulf of Tonquin, and Siam).

The river *Hoang-ho* flows into the Yellow Sea. It flows through the region of yellow earth, which yields excellent crops, and by means of the river these productions are brought down to the Yellow Sea for exportation. The Peiho brings foreign trade in contact with Pekin and Tientsin.

The *Yang-tse-kiang*, flowing into the East S., is the means of bringing inland productions down; also nankeen from Nankin; tea and silk from Hankow.

The *Si-kiang* enables foreigners to reach Canton, a great commercial city.

The *Mekong* and *Meinam* flow into the Gulf of Siam and open up trade with Udong and Bangkok.

The peninsular character is shown still stronger on the South coast, where we have the immense peninsulas of *Arabia*, *India*, and *Further India*, enclosing the *Persian Gulf*, *Arabian Sea*, and *Bay of Bengal*.

The rivers *Euphrates and Tigris* flow into the Persian Gulf, thus introducing trade into Mesopotamia.

The *Indus*, *Nerbudda*, *Tapty*, are of great commercial importance to the Arabian Sea.

The Indus bringing productions from the Punjaub and Rajpootana States to Kurrachee.

The Nerbudda and Tapty from the Deccan to Baroche and Surat.

The rivers flowing into the Bay of Bengal are Ganges and Brahmapootra, giving facilities for immense commerce with the Plain of Hindostan.

The Mahanuddy, Godavery, Kristna, and Cauvery, come from the Deccan.

The Saluen and Irawady are also the great commercial waterways of Burmah.

2. Give the exact position and say what you know of the Tundra, Vladivostock, Goa, Kandy, Darjeeling, Aleppo, Yemen, Khelat.

Place.	Position.	Importance.
VLADIVOSTOCK -	Southern extremity of Russian Manchooria, on S. of Japan; Long. 133 E.	Russia's chief naval station on Pacific. Exports — coal, iron, timber.
TUNDRAS - -	Flat marshy plains in N. Russia and N. Siberia.	The only vegetation is herbage-mosses and lichens.
GOA - - -	India Malabar Coast; 74° E. Long., 16° N. Lat.	A Portuguese possession, was once very wealthy; is now almost deserted.
KANDY - - -	Centre of Ceylon, old Capital.	Summer retreat.
DARJEELING -	Is in Bengal south of Sikkim, and between Nepaul and Bhotan.	A military garrison is stationed there. Wheat is growing in the surrounding country.
ALEPPO - - -	In N. Syria; 37° E. Long., 37° N. Lat.	Chief caravan station between Euphrates and Mediterranean. Before construction of Suez Canal was a great trading city.
YEMEN - - -	S. of Arabia, country bordering on Red Sea.	Most prosperous country of Arabia, capital is Sana.
KHELAT - -	Capital of Beloochistan; Long. W. 67°, 29° N. Lat.	On account of its high position it commands all the roads to Persia, India, and Afghanistan.

3. What is known respecting the size and population of China? Give the names and position of its six largest towns, and say what you can of each.

Extent of empire is estimated at about 4,180,000 sq. miles. (China Proper, 1,300,000 sq. miles). Manchuria, 363,000 sq. miles. Mongolia, 1,288,000 sq. miles. Thibet, 651,000 sq. miles. Zungaria, 148,000 sq. miles. E. Turkestan, 580,000 sq. miles.

Population—China Proper, estimated at 383,000,000; Manchuria, 12,000,000; Mongolia, 2,000,000; Thibet, 6,000,000; Zungaria, 600,000; E. Turkestan, 580,000.

Place.	Position.	Importance.
PEKIN - - (1,500,000)	Capital; on the Peiho.	Consists of two cities, Tartar and Chinese cities; contains Imperial palace and Temple of Heaven.
CANTON - (1,700,000)	Mouth of the Si-kiang.	Largest and chief commercial city of China; noted for silk, porcelain, glass, etc.
TIENTSIN - (1,000,000)	On the Peiho, port of Pekin.	Here are the Government granaries and salt depôt for N. China.
HANKOW - (800,000)	400 miles from mouth of Yang-tse-kiang.	Has a great trade in tea, silk, oil, tobacco, and opium.
SHANGHAI - (400,000)	Near the mouth of the Yang-tse-kiang.	Carries on trade with England, America, and France in tea and silk, possesses dockyards.
NANKIN - (230,000)	100 miles up the Yang-tse-kiang.	Nearly destroyed in the Taiping rebellion, 1864, manufactures satins, nankeen, paper.

4. 'The rivers as well as the lakes of Africa are most unequally distributed over the continent; most of them have rapids and cataracts in their middle courses, short and ill-developed lower courses, and dangerous sand banks at their mouths.' Prove the above statements by a description of three of its rivers and three of its lakes.

Taking the three rivers, Nile, Congo, and Zambesi, with the lakes Victoria and Albert Nyanza (source of the Nile) and Tanganyika (a source of the Congo), we find that all this water is in the eastern portion of the continent, whilst the western portion is comparatively dry and desert. All the lakes are grouped in the *central* portion of eastern part.

Taking the river *Nile*, we shall see that it does not receive a single affluent below the Atbara; but the stream grows smaller and smaller as it nears the sea. The sandbanks at its mouth cover an area of 10,000 sq. miles. From a little distance above the confluence of the Atbara with the Nile and the sea there are six cataracts.

The *Congo* first flows to the north, receiving the Lukuga from Tanganyika. From its source to Lake Moero it has so many

rapids that it falls 1,500 ft. in less than two miles. The river flows N. to the equator, where there are seven cataracts (Stanley Falls). It receives numerous tributaries (Aruwimi Kassai), and flows south through Stanley Pool; from here to the sea navigation is spoiled by numerous rapids and cataracts, the chief being Yellala Falls.

The *Zambesi* rises near the Congo, and flowing south passes over rapids; *e.g.*, Gongé Falls. Beyond this there are from 40 to 50 rapids. It is joined by the *Chobe*, when it turns east, and soon rushes over a precipice 100 feet deep, and rapids for another 600 ft.; it also contracts from 1,000 yards to 70 feet (called by Livingstone *Victoria Falls*). The river now turns N.E., receiving the Loango on the left bank, and rushing over the *Kebrabasa* Rapids it receives the *Shiré* from Lake Nyassa, after which, forming an immense delta with numerous sandbanks, it enters the sea.

5. (*a*) Which are the two most regular systems of winds on the globe? (*b*) Where do we meet with irregular systems and with periodical winds? Say what you know about the last named.

(*a*) The two most regular systems of winds are (1) the N.E. Trades and the S.E. Trades, which blow with great regularity (where high land does not intercept them) for 30° on each side of the equator. (2) The 'Return Trade Winds' blowing from about 30 to 65° on each side of the equator.

(*b*) We meet with irregular winds round about the equator and in the deserts; *e.g.*, Simoom (Africa and Arabia), Harmattan (Sahara), Sirocco (Mediterranean), Cyclones, Typhoons, Pamperos, Tornadoes.

We meet with periodical winds chiefly in the Indian Ocean and the southern part of Asia and in the Gulf of Guinea.

These Monsoons are called S.W. Monsoons when blowing from the S.W., from April to October, and N.E. Monsoons when blowing from the N.E., October to April.

In summer the air on the Thibetan Plateau being rarefied, there is a rush of air from the S. to balance the pressure, and we have the S.W. Monsoon. In winter this state of things is reversed and we get the N.E. Monsoon.

Other periodical winds are the land and sea breezes; a breeze setting in from the sea in the daytime is replaced by one from the land in the night-time.

6. Draw a map of South Africa.

See any good atlas.

FIRST YEAR.

1. Add together 21·75 of 7s. 6d. + ·3625 of 10s. + 13.75 of 1s.

Ans. £9 0s. 6d.

2. Simplify $\frac{1\frac{1}{2}+8\frac{3}{4}}{6\frac{3}{4}+2\frac{7}{8}} - \{9\frac{1}{3} \div 4(5\frac{5}{6} \text{ of } \frac{6}{7})\}$. Ans. $\frac{3}{4}$.

3. Make out the following account:—

239 lbs. of tea @ 1s. 10d. per lb.	Ans.	£21 18s. 2d.
961 lbs. of sugar @ 2¾d. ,, ,,	Ans.	£11 0s. 2¾d.
1½ cwt. of butter @ 9½d. ,, ,,	Ans.	£6 13s. 0d.
17 hams @ £1 9s. 9d. per couple.	Ans.	£16 17s. 10½d.
	Total	£56 9s. 3¼d.

4. Write in *Largehand:* Crystal, Dryad, Gymnast, Ure, Xylo, Youth, Every.

Write in *Smallhand*—

'For though from out the bourne of time and place
The tide may bear me far.'

5. Analyse the appended excerpt, and parse the italicised words:—

'*Who* to dumb forgetfulness a *prey*,
This pleasing anxious *being* e'er resigned,
Left the warm precincts of the cheerful day,
Nor cast one longing, *lingering* look *behind?*'

6. Name five of the more important auxiliary verbs. Explain their meaning and use.

7. Give a brief account of the Normans prior to 1066.

8. Draw a map of Ireland.

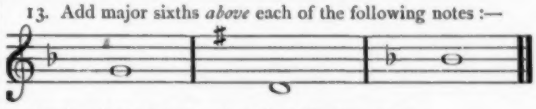
9. Trace the course of a wheat-laden ship from Chicago to Montreal, noting the towns on the lakes, and the characteristic features of the river from Lake Ontario to Montreal.

10. For what events are the following years memorable:—61, 410, 597, 664, 878, 1016.

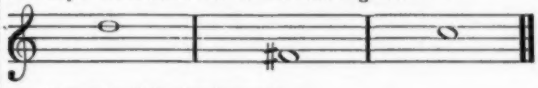
11. Name the three great kingdoms into which Saxon England was in time divided, and sketch the rise of *one* of them.

12. How would you teach Long Division?

13. Add major sixths *above* each of the following notes:—



and major thirds *below* each of the following notes:—



OR

Name the following intervals

d' | s | l | t | m ||
m | f | r | d | t_1 ||

14. Decline in the plural *hic* and *iste*, OR Describe how the comparative degree is formed in French.

15. Give the dative singular and plural of *somnus*, *dies*, *musa* and *lex (legis)*, OR Decline the Personal Pronouns in French.

SECOND YEAR.

1. A and B have each £1800 to invest; A invests in a 3¾ per cent. stock at 108, and B in a 2¾ per cent. stock at 96. Compare their incomes, neglecting brokerage.

Ans. A has £10 18s. 9d. more than B.

2. Find the cost of painting the four sides and bottom of a tank 3½ yards long, 3½ feet wide, and 6 feet deep, at 4d. per sq. foot.

Ans. £3 8s. 3d.

3. Find the value of $\frac{3}{7}$ of 9s. 11d. + $\frac{5}{11}$ of £1 10s. 3d. *minus* $\frac{4}{17}$ of 12s. 9d. + $3\frac{1}{3}$ of £3 19s. 6. Ans. £14 8s. 10d.

4. As in First Year.

5. Analyse the following passage, and parse the words in italics:—

Attend all ye who list to hear our noble *England's* praise,
I *tell of* the thrice famous deeds she *wrought* in ancient days,
When that great fleet *invincible* against her bore in *vain*
The richest *spoils* of Mexico, the *stoutest* hearts of Spain.

6. Place after each of the following words its idiomatic preposition and employ it in an appropriate sentence:—Counter, Different, Opposite, Adverse, Depend, Descanted, Arrayed, Absolved, Juxtaposition.

7. Write out an account of any noble deed.

8. Draw a map of France.

9. Name the inland seas of Europe, and the countries contiguous. Note also any points of difference between the Baltic and the Black Sea.

10. What events are associated with the following dates?—1346, 1381, 1403, 1415, 1455, and 1471.

11. What was the extent of Henry II.'s dominions when he ascended the throne?

12. Define *angle, rectilineal angle.* Write out Euclid I. 23.

What materials are ordinarily used in washing, and for what purposes?

13. How would you arrange a class for a Reading Lesson? How would you ensure attention to the backward readers without neglecting the good ones?

14. Write a diminished or minor fifth above each of the following notes:—E, G, A, F, D, B, F♯, OR

Write the following intervals:—

Perfect fifth above *te*,, Major Sixth above *doh*,
Major third ,, *ray*, Perfect fourth ,, *fah*,
Minor ,, ,, *soh*, Minor seventh ,, *me*.

15. Decline *illud templum*, OR Give all the different forms of the French Possessive Adjective Pronouns.

16. Give the adverbs derived from *bonus, malus, felix, gravis*, OR When is the Past Participle in French inflected?

PUPIL TEACHERS' ROUTINE FOR SEPTEMBER 1893.

DAYS	YEARS	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
		First Lesson	Second Lesson	Third Lesson	First Lesson	Second Lesson	Third Lesson	First Lesson	Second Lesson	Third Lesson	First Lesson	Second Lesson	Third Lesson
Monday	1	Analysis and Parsing	Battles of the Period	Maps of Wales and Scotland	Composition *or* Paraphrasing	How to teach Writing	Geography of Scotland	Analysis and Parsing	How to teach Arithmetic	Maps of England and Ireland	Composition *or* Paraphrasing	Revise Dates	Geography of Australia
	2			Maps of France and Italy			Latitude and Longitude'			Map of Spain, Map of Coast from Gibraltar to Venice			Geography of Europe
	3			Map of India		Notes of an Arithmetic Lesson	Geography of Asia *or* Africa		Notes of a Lesson on Form	Map of Mediterranean Sea			Geography of Africa
Tuesday	1	Euclid Pps. 1 to 4. Definitions, etc. Paper Patterns	Abstract Vulgar Fractions. Practice	Lives of Great Historic Persons	Euclid Book I. Deductions. Paper Patterns	Vulgar Fractions of Money Bills of Parcels	Lives of Great Historic Persons	Euclid I. 5 to 13. Practise Stitches	Vul. Fractions of Weights and Meas Add. of Vul. Fracs.	Scripture *or* Revision	Euclid I. Deductions. Practise Stitches	Brackets in Algebra. Any Geography	Needlework *or* School Management
	2	Euclid I. 1 to 15. Paper Patterns	Simple Proportion Money. Vulgar Fractions.		Euclid I. Deductions. Flannel Patch	Stocks. Vulgar Fractions of Weights		Euclid I. 16 to 26. Practise Stitches	Percentages Reductions of Vulgar Fractions		Euclid I. Deductions. Practise Stitches	Algebraic Factors Any Geography	
	3	Euclid I. 1 to 27. Paper Patterns	Comp. Proportion. Any Vulgar Fractions		Euclid I. Deductions. Practise Stitches	Equation of Payments. Decimals of Money		Euclid I. 27 to 48. Any Needlework	Discount Decimals of Measures		Euclid I. Deductions. Any Needlework	Simple Equations. Any Geography	
Wednesday	1	History from 55 B.C. to 410	Composition *or* Paraphrasing	Scripture *or* Revision	History from 410 to 871 A.D.	Grammar from Text-book	Scripture *or* Revision	History from 871 to 1016 A.D.	Prefixes, Roots, *or* Affixes	Needlework *or* School Management	History from 1016 to 1066 A.D.	Grammar from Text-book	Revise Geography *or* Euclid
	2	History from 1066 to 1135 A.D.			History from 1135 to 1215 A.D.			History from 1307 to 1376 A.D.			History from 1422 to 1485 A.D.		
	3	History from 1485 to 1547 A.D.			History from 1547 to 1588 A.D.			History from 1628 to 1649 A.D.			History from 1666 to 1688 A.D.		
Thursday	1	Geography of England	Addition of Algebra *or* Any Arithmetic	Literature *or* Lives of Authors	Geography of Ireland	Subtraction of Algebra. Any Dates	Dates	Geography of British North America	Multiplication of Algebra *or* Any Grammar	Dates	Physical Geog. of Mountains and Rivers	Literature *or* Lives of Authors	Division of Algebra. Any Dates
	2	Geography of Europe	Addition of Algebra *or* Any Arithmetic		Geography of India	Subtraction of Algebra. Any Dates	History from 1215 to 1307 A.D.	Geography of India	Multiplication of Algebra. Any Grammar	History from 1376 to 1422 A.D.	Climates and Productions of our Empire		Division of Algebra. Any Dates
	3	Geography of Asia	Simple Equations. Any Arithmetic		Geography of Africa	G.C.M. of Algebra. Any Dates	History from 1588 to 1628 A.D.	Geography of Asia	Mensuration of Triangles *or* Any Grammar	History from 1649 to 1666 A.D.	Winds and Ocean Currents		Mensuration of Parallelograms. Any Dates
Friday	1	Abstract Decimals, Household Accounts	**Test Examination** (See appended Questions)		Decimal Fractions of Money Practice	**Test Examination** (See appended Questions)		Dec. Fractions of Weights and Meas. Subt. of Vul. Fracs.	**Test Examination** (See appended Questions)		Reduction of Fractions. Bills of Parcels	**Test Examination** (See appended Questions)	
	2	Comp. Proportion. Reduction of Vulgar Fractions			Averages. Vulgar Fractions of Measures			Stocks. Vul. Fractions of Weights and Meas.			Any Problems. Simple and Compound Practice		
	3	Stocks. Simple Proportion			Square Root Repeating Decimals			Stocks. Decimals of Weights			Discount. Simple Proportion		
Saturday	1	French *or* Latin	Grammar from Text-book	Drawing *or* Writing	Theory of Music	French *or* Latin	Enunciations only of Euclid *or* Any Sewing	Drawing *or* Needlework	Singing	French *or* Latin	Proofs and Illustrations of Arithmetical Rules	Drawing *or* Writing	Theory of Music
	2												
	3												

Saturday	1	French *or* Latin	Lines of Latitude and Longitude of the required Maps	Drawing *or* Needlework	Singing
	2				
	3				

THIRD YEAR.

1. In a room 25 feet square, a carpet $21\frac{1}{2}$ feet square was laid down in the centre parallel to the sides of the room, the margin was covered by an oil-cloth which over-lapped the carpet 6 inches all round. If the oil-cloth cost 3s. per square yard, and the carpet 6s. per square yard, what was the whole cost?

Ans. £18 16s. 5d.

2. A man leaves two of his daughters $\frac{5}{13}$ and $\frac{3}{11}$ of his property respectively, and the remainder to a third; the first had £12,507, what did the third have? Ans. £11,142 12s. 0d.

3. Find the value of ·025 of £3 5s. 0d. + ·07 of £2 1s. 3d. + ·053 of £1 0s. 7½d. + ·075 of 15s. Ans. 15s. 9¼d.

4. As in First Year.

5. Analyse the following passage and parse the indicated words :—

'But Cranmer, *lifting up* his *eyes* to Heaven,
Thrust out his hand into the gnawing flame
And felt it *crackling burn*; the *while* he cried
"This *hath offended—this* unworthy *hand.*"
Then while the cruel *flames* assailed his frame
His face illumined *like* the *face* of him
Who talked with God on Horeb's sacred top:
And *as Elijah* in ethereal fire
So Cranmer passed in glory-flames to God.'

6. If there be anything wrong in the following sentences, correct it, giving reasons :—

The enemy flew before us.
None were permitted to approach the shrine.
He proposed to me three alternatives.
I gave him the option of choosing.
He blames Mary, because she loves dancing.
They will not sing nor dance.

7. Relate any remarkable incidents of animal instinct.

8. Draw a map of India.

9. Give the exact position and say what you know of the Tundra, Great Karoo, Vladivostock, Fez, Goa, D'Urban, Kandy, Darjeeling, and Khartoum.

10. What events are associated with the following dates—1646, 1651, 1665, 1679, and 1688?

11. Henry VII. initiated the home and foreign policy of the Tudors. State what was this policy, giving examples.

12. Prove the two corollaries of Euclid I. 32.
Describe the advantages and disadvantages of roasting, boiling, and stewing.

13. Write out Notes of a Lesson on Terminating Decimals, OR (for Infants) on the Square.

14. (*a*) $\frac{2(x-3)}{7} - \frac{5(x+5)}{8} + 5\frac{19}{28} = 0.$ Ans. $x = 5$.

(*b*) Out of a cask of wine of which a fifth part had leaked away, 10 gallons were drawn, leaving the cask two-thirds full. What was the cask's capacity? Ans. 75 gallons.

15. A square whose area is 45 square inches has its sides trisected, and the nearest points of trisection so joined as to cut off its corners. Find the area of the resulting octagon.

Ans. 35 sq. inches.

16. Write the following intervals :—(*a*) Augmented fifths *above* A, E, F, (*b*) Diminished sevenths *below* G, C, B♭, OR
State the pitch of the following notes (as C, D, G, etc.) supposing the key to be F :—

d n t, d l s r m

17. Name some Latin verbs which are followed by the Genitive or Ablative Case, OR Give in each instance two French Adverbs of Manner, Degree, Time, Place, and Affirmation.

18. Distinguish *alius* and *alter*, *iste* and *ille*, OR Give three Verbs which require *de*, and three which require *à* before the words that they govern.

N.B.—We have made arrangements whereby the answers to the above questions may be corrected and commented on, fee 10s. 6d. per annum. Pupil Teachers may join this class at any time. Apply to Dr. G. Beach, M.A., Stanley Mount, Macclesfield.

(*For Correspondence, see end of Certificate Article.*)

MANUAL INSTRUCTION.

Account of a Recent Examination of an Organised Science School by the Science and Art Department.

Some short time ago, a large organised science school in the North of England was examined in first year Manual Instruction. Over seventy boys were presented. A most inconvenient time of the day was selected for the examination, namely, four o'clock; however, at the time, punctually, in walked the Department's Officer. As this was the first time an examination of this kind had ever been held in this locality, some little ouriosity was manifested as to the nature of the examination about to be given. Be it said for the Department, they sent an Officer who thoroughly understands his work, and who knows what boys of 11, 12, and 13 can do. At the commencement of the proceedings, the Officer pulled out of his pocket the following plan and elevation of a 'Tredgold notch,' and asked one of the teachers to put a rough drawing on the board so that the boys could copy on small slips of paper and work from

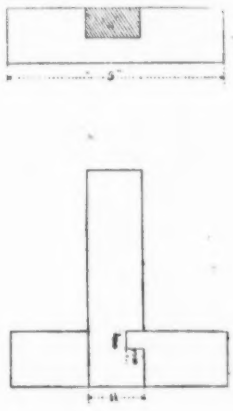


Fig 1

them. It was pointed out that the joint was a difficult one for boys, and was not included in our course, which had been submitted to one of the Department's Officers previously and approved. It was further pointed out that the same joint had just been given to schoolmasters in the first year's examination of the City and Guilds of London Institute. It was not pressed, and a joint was selected from the course through which the boys had been during the year. This joint was the 'half-mitre joint.'

It seemed a little peculiar to us, that we should be asked to put an isometric drawing of this joint on the board, as shown in Figure 2, and that some of the boys should be asked to draw from that a plan, elevation, and side elevation, as shown in Figure 3.

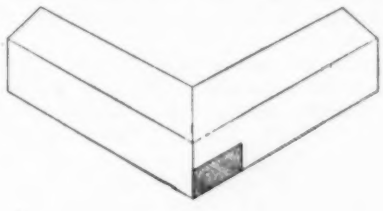


Fig 2.

Twenty-six of the boys were asked to sketch roughly Figure 2, and go to the benches and execute in wood the said joint to sizes given on the drawing. Those left in the room were required to draw full sized drawings of Figures 3 and 4 from Figure 2, which was put upon the board by the teacher.

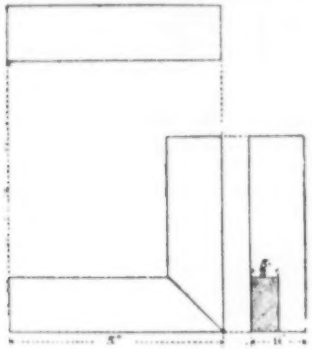


Fig 3

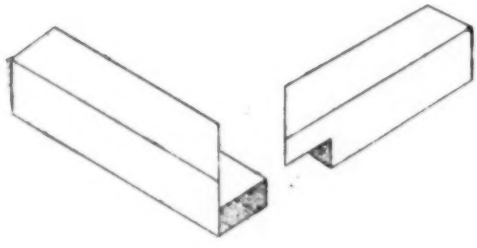


Fig 4

In the meantime the Inspector visited the work-room and watched generally how the boys handled the tools and executed the various exercises. Next we find him in the drawing-room carefully examining every boy's book round the whole class. Now they are closed in, and a perfect shower of questions on tools, wood structure and principles generally, is given. The following are some of the questions :—

Tools.—The three bench-planes were placed on end on the bench. What are these? Why are they called bench-planes? A jack-plane was shown, and class required to name the different parts—stock, mouth, throat, &c.

Questions on the construction were also asked. How is the face of this plane made, and why? How are the faces and soles of all planes made?

The saws were dealt with in a similar manner. Questions bearing on teeth, set, shape, and names of saws were given.

Other tools were also taken and dealt with in like manner.

Timber.—A cross section of larch and oak were placed before the boys, and the following questions were given :—

What class of tree do you call this? Why? What other class do you know? Which is the most useful? Why? I notice in the inner portion of this tree a darker centre, Why is it so? What do you call it? What is the duramen? What is this discoloured part? Why is it called sap wood? Can you give me any other name? Let it be noted that forty-five minutes were spent in questioning the class. After this was over, the examiner expressed himself satisfied and went upstairs to further examine the bench work. Each boy fell into line and passed round the end bench, at which sat the Inspector. The exercises were carefully noted, and this little fault or the other was pointed out. Six o'clock saw him gone, and we thought if this be a first year's examination in wood-work by the department, what will a second year's examination be like?

THE 1894 SCHOLARSHIP EXAMINATION.

BY DR. GEORGE BEACH, M.A.,

Co-Author of 'A Manual of our Mother Tongue,' 'A Girl's Arithmetic.' Author of 'Elements of English,' 'Entertaining Readers,' etc.

THE examination towards which the thoughts of all Fourth Year Pupil Teachers and many outsiders are turned is not in itself a formidable one, but for those candidates who desire to enter a Training College it is a very trying ordeal on account of the lack of Training College accommodation.

For those who are merely qualifying for Assistantships the number that may pass is unlimited, and the industrious mind may steadily work on with almost a certainty of success if it follow our directions.

The competition, however, for admission to a Training College will be exceedingly severe, and will need special exertion, great self-denial, close attention to detail and technical coaching if the desired goal is to be gained.

At the Queen's Scholarship Examination held in 1892 the number of candidates examined was 10,825. Of these 8,020 or 74·1 per cent. passed. Of the successful ones only 25·5 per cent. managed to secure entrance into college, and of all the candidates only 19 per cent. The way being therefore so narrow, and the gate so strait, we cannot promise to secure for our readers the coveted residential training, but we do aver that all who will closely, carefully, and intelligently accept our guidance will secure a *First Class.*

'*When shall I sit at the Examination?*' is an oft repeated question. Unhesitatingly we say to the competitive portion of students, '*Defer the examination as late as you can.*'

By so doing you will obtain at least another year for extra study, a further opportunity for earning marks in such extra subjects as Music, Science, Drawing, and Language, and what is perhaps most important of all, an additional twelve months' ripeness of intellect.

Moreover, do not set your affections upon entering some particular college at which you are perhaps unknown, but enter your name AT ONCE for any college upon which you, or your school, your diocese, or your instructor has any claim.

As most of the residential college accommodation is denominational, it will most probably be advisable for many School Board Pupil Teachers to endeavour to enter Day Training Colleges.

With every respect for the Metropolitan institutions, and without for one moment minimising in the least degree their high state of excellent efficiency, we do venture to assert that in comparison with them the provincial colleges are too greatly depreciated. There is NO Training College in England by residence in which an average student cannot earn a First Class Certificate.

The examination itself will be held early in July ; permission to attend it should be immediately sought, the marks for Repetition, Reading, Teaching, should be secured at next school inspection, and care must be taken that a due entry of the candidate's intention is inserted in the School Examination 'Form IX.' 'Form 13' must be duly filled up and forwarded to the Department before 1st May next.

By a recent circular the marks above referred to may be gained, if the Inspector so decide, at a collective examination.

Pupil-Teachers who during their engagement successfully papers in Free-hand, Model, Geometrical, and Perspective Drawing are credited with marks not only for this examination but for the certificate examinations besides.

In Languages a candidate has the choice of *one* of the following :—

i. Latin.
ii. Greek.
iii. French.
iv. German.
v. Welsh.
vi. Hebrew.

The passages for translation will be taken from—

i. Cæsar, '*De Bello Gallico.*' Book I.
ii. Xenophon, '*Anabasis.*' Book I.
iii. Le Maistre, '*La Jeune Sibérienne.*'
iv. Hauff, '*Die Karavane.*'

Science is represented by *one* of the following subjects :—

i. Mechanics of solids and fluids,
ii. Chemistry,
iii. Animal Physiology,
iv. Sound, Light, and Heat,
v. Magnetism and Electricity,
vi. Physiography,
vii. Botany,
viii. Agriculture,
ix. Hygiene,
x. Physics,

but the *pass* must have been obtained in one of the two years immediately preceding the Scholarship Examination.

We recommend either Physiography or Hygiene as being without doubt the best to attempt.

Music is the easiest subject, but until recently has been the most neglected. Owing, however, probably to the rapid extension of teaching Singing-by-note to the scholars, it has now come more into vogue. Nevertheless the marks for Practical are still in very many cases allowed to go by default. At the recent examination numbers held back on account of a certain necessary-to-be-discarded shyness.

Girls (or Women) will also have a paper in Domestic Economy, and as this subject is not examined during apprenticeship it is frequently admirably neglected. To partially remedy this, special attention will be devoted to it in our Articles, Routines, and Questions.

A word or two about these last :—

The Articles will contain much up-to-date matter not to be found or expected in the ordinary text-books. They will deal with the peculiarities of questioning, the methods of answering, the best means of studying the salient points of any subject, and the selection of suitable books. They will warn off from dangers, will contain model answers, and will be in general a guide, philosopher, and friend.

Much valuable advice and information will be weekly furnished by 'THE INFANTS' MISTRESS.'

The Routines will be so adapted as to secure—

(*a*) A thorough covering of the whole syllabus area over and over again.

(*b*) An equitable division of time among the various subjects in proportion to their examinational importance.

(*c*) Relief to the brain by the juxtaposition of diverse subjects and the separation of similar ones.

(*d*) The same subjects being taken at the same time (as far as possible) by both Men and Women.

(*e*) The study of such subjects as mathematics for men, whilst the women are engaged with needlework and domestic economy.

(*f*) Ample opportunities for revision and test examinations.

(*g*) Sufficient time for rest, exercise, and recreation.

THE QUESTIONS will be set weekly, or to speak quite accurately, four times per calendar month, and will comprise all set during recent years. They will be carefully selected so as to embrace all the principal points of every subject, and will only overlap in so far as the intrinsic value, or the department's idea thereof, of the matter tested demands.

Nor will one set be devoted to one subject, but to the whole examinational range.

Our experience in '*Coaching*,' now extending over more than 20 years, has shewn that on the whole, that method of studying pays best which keeps all the subjects in hand instead of taking them up in turn. The latter plan involves the neglect of each subject for a considerable period and greater mental fatigue.

The 'PRACTICAL TEACHER' scheme of questions also greatly assists revision.

We have made arrangements for tuition, based upon these articles, by experienced Certificated Teachers and Graduates. Names of intending pupils should be sent in at once to *Dr. G. Beach, M.A., Stanley Mount, Macclesfield.* The fees, to be paid in advance, are 1s. 6d. per week, or 5s. 6d. per month, or 15s. 9d. per quarter, or £2 10s. the whole course. Fortnightly papers at half the cost can be arranged.

TEXT BOOKS.

We recommend the following :—

Miscellaneous. The N. U. T., or Heller's Code, Stormonth's Dictionary, Dunstan's 'Teacher's Manual of Music,' Hughes's 'Scholarship Copy Book,' Hughes's 'Art of Handwriting,' and Halford-Hawkins' 'Art of Reading and Recitation.'

School-Management. Flux's 'Scholarship School Management' (J. Hughes & Co.), Mrs. Mortimer's 'Practical Kindergarten Lessons.' (*For Infant Teachers.*)

Geography. Gregory's 'Physical and Astronomical Geography,' Gregory's 'Physical Geography,' 'Brook's Geography,' W. and A. K. Johnston's 'Multum in Parvo Atlas,' 'How to draw a Map,' and Arnold's 'Memory Maps.'

History. Carpenter's and Green's 'Outlines of British History,' Green's 'Main facts and Dates of British History,' McLeod's 'Constitutional History,' and W. and A. K. Johnston's 'Historical Atlas.'

Arithmetic. Wollman's 'Teacher's Arithmetic,' Dixon and Beach's 'Arithmetic,' Pendlebury's.

Algebra. Knight's Factors and Hamblin Smith's.

Mensuration. Todhunter's.

Euclid. Deighton's, Egan's Exercises, Part I.

Domestic Economy. Hughes's, Mrs. Beach's, Parts I., II., III.

Sewing. Miss Warren's School Needlework (Joseph Hughes & Co.).

French. Professor Darqué's 'French Course,' Darqué's 'La Jeune Sibérienne.'

Latin. Huxley's 'Latin Course.'

Physiology. Professor Walker Overend's.

The 'above' works are amply all that are necessary, and are, we believe, absolutely the best of their kind, full of the most recent information, of matter wisely selected and interestingly arranged, and are low in price. We entreat our Readers not to put up with antiquated manuals, but to purchase the best tools and use them to good purpose. A half-crown saved at the cost of only a dozen marks is expensive frugality.

MODEL ANSWERS.

It was hoped that all the remaining queries of the 1893 Scholarship could have been this month inserted; but the imperative limits of space compel us to keep over until next month the Geography, History, and Music.

DICTATION.

(*For the Examiner.*)

The passage should be read ONCE *distinctly, and then dictated once, in portions, as marked. Full stops only should be given.*

If the room is large, and there is danger of your not being heard at its extremity, you may permit one of the officers of the College to stand half-way down the room, and repeat the words after you, exactly as you give them out.

IT IS ESSENTIAL *that there be no complaint on the part of the Candidates that they could not hear or understand; you can only prevent this by clearness, accuracy, and audibility.*

I saw her | just above the horizon, | decorating and cheering | the elevated sphere | she just began to move in, | glittering | like the morning-star, | full of life, | and splendour, | and joy. | Oh! what a revolution! | and what a heart must I have | to contemplate | without emotion | that elevation | and that fall! | Little did I dream | that I should have lived | to see such disasters | fallen upon her | in a nation of gallant men, | in a nation of men of honour | and of cavaliers. | I thought ten thousand swords | must have leaped | from their scabbards | to avenge even a look | that threatened her with insult. | But the age of chivalry | is gone. |

DICTATION AND PENMANSHIP.—MEN AND WOMEN CANDIDATES.

Wednesday, July 5th, 2.0 to 2.20.

Candidates are not to *paint* their letters in the *Copy-setting Exercise*, but to take care that the copy is clean and without erasures.

Omissions and erasures in the *Dictation Exercise* will be counted as mistakes.

The words must not be divided between two lines; there is plenty of room for the passage to be written.

Write in large hand, as a specimen of Penmanship, the words—

Polarized Ray.

Write in small hand, as a specimen of Penmanship—

Where Blake and mighty Nelson fell
Your manly hearts shall glow.

Write the passage dictated to you by the Examiner.

SCHOOL MANAGEMENT.—MEN AND WOMEN CANDIDATES.

Thursday, July 6th, 9.45 to 12.15.

All Candidates must answer Question 1, and not more than *seven* other questions.

If you answer more than *eight* questions, only the *eight* answers coming first on your paper will be revised.

1. Write out full notes of a lesson on one of these topics :—
   (*a*) The seasons.
   (*b*) (*For infants.*) A shilling.
   (*c*) Adjectives, adjective phrases, and adjective sentences.
   (*d*) The use of laws.

Notes of Lesson on Adjectives, Adjective Phrases, and Adjective Sentences.

The children are assumed to have a knowledge of adjectives —that is to be able to pick them out and to know their uses.

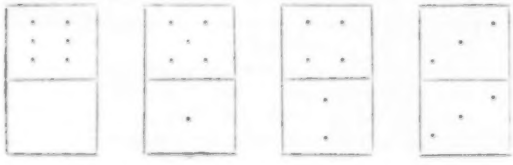
Examples.	Truths deduced therefrom.
Write down on board a sentence containing an adjective, *e.g.* :— 'The ugly dog ran down the street,' and deduce part of speech of 'ugly.'	Ask class what part 'ugly' plays in the sentence—what is its use? Tells what kind of a dog; therefore it is an Adjective. Ask for other sentences containing adj. and write them down on blackboard.
Next write on board the sentence with the adj. changed into a prep. phrase, *e.g.* :— 'The dog with the ugly face ran down the street.'	Lead class to see that the words 'with the ugly face' bear the same relation to 'dog' that 'ugly' does, that is, they tell what kind of a dog. These words agree among themselves in parsing, that is, they do not belong to any other word in the sentence, except when taken as a whole, and therefore constitute what is called a phrase.
Name. Because 'with the ugly face' is a phrase equivalent to an adjective it is called an Adj. Phrase.	Ask for the adjectives in the sentences previously given to be changed into equivalent phrases.
Again, write down the sentence, this time substituting a complete sentence for 'ugly,' *e.g.* :— 'The dog which had an ugly face ran down the street.' *Name.* Because 'which . . . face' is a sentence equivalent to an adj. it is called an Adj. Sentence.	Class will easily see that the meaning has not been changed, and that the sentence 'which had an ugly face' tells what kind of a dog in the same way that 'ugly' does. Show why 'which . . . face' is a sentence, and the difference between it and the phrase. Require the adjectives in the sentences previously given to be converted into corresponding Adjective Sentences.

2. Say what sort of pictorial or other visible illustration you would use in teaching the elements of arithmetic to very young children, and show what use you would make of such illustrations.

The best *pictorial* illustrations of number are domino sheets, whereon the spots for any particular number are always arranged in a uniform manner. Thus the children will associate a particular arrangement with its chosen number, *e.g.*, 4 with the square, 5 with the diagonalled square. *Strokes* upon blackboard or slate are by no means to be despised if judiciously confined to initial stages.

The old-fashioned abacus, or ball-frame, and its modern adaptation of strings of beads, cubes, and rectangular prisms marked off into cubes, jointed laths, and such common objects as pennies may be used with great advantage.

The *domino sheets* are especially helpful for assisting lessons on a given number (say) '6.' In this case four illustrations will be requisite,



From these it may be shown that $0+6=6$; $1+5=6$; $2+4=6$; $3+3=6$; that half of $6=3$, and that $2\times3=6$. Also that $6-0=6$; $6-5=1$; $6-1=5$, etc.

Balls, beads, etc. not only illustrate, but are means of actually performing elementary addition and subtraction.

With the cubes and rectangular prisms, not only counting, but comparison by measurement may be exemplified. Tillich's 'brick-box' is of great use.

3. Give some simple rules showing the best way of conducting a class lesson in writing.

The scholars must be seated comfortably, in full view of the blackboard, and with materials quite ready. The teacher will then carefully write the first word of the copy to be written, on the board, which is ruled so as to exactly correspond with the children's papers. He will call attention to all 'catchy' parts —joinings, curves, etc.—and when the class fully understand these, the order may be given for pens to be taken up. Care must now be taken that each child sits upright and in a proper manner to the desk, and that he holds his pen properly—two fingers on pen, and pen not held too tightly or too near point.

The copy written, or a portion of it, may now be imitated by the children, the teacher meanwhile moving round the class, correcting mistakes, and writing model letters with blacklead. The most common mistakes should be corrected by means of the blackboard, the wrongly-formed letter and the model being written side by side. When the first portion is finished, the remaining words may be treated in a similar manner.

4. Give a summary of the requirements of the Code in the subject of Geography for the several standards.

See Code.

5. Show in how many ways you could vary exercises in Mental Arithmetic suited either (*a*) for the upper class in an Infant School, or (*b*) for Standard V.

In addition to the questioning in which only the four common rules are employed—revision of previous standards—exercises may be given on fractions, including addition and subtraction and also easy multiplication and division; easy fractions may also be required to be changed into decimals and *vice-versâ*. Questions involving the aliquot parts of different quantities and weights, and easy proportion sums, will also materially aid the arithmetic of the standard. 'Per cent' and 'Interest' should be explained, and easy questions pertaining to Simple Interest should be given as an introduction to the work of Standard VI. Easy ways of performing certain operations, such as multiplying by 25 by adding two 0's and then dividing the answer by 4, finding price at 2s. 7½d. by taking 2s. 6d. and 1½d., should also be taught, but not indulged in too freely.

6. Make a list of object lessons suited *either* for an infant class or for older children. Show in which of the subjects you would think one lesson sufficient, and to which you would assign two or more lessons.

Geographical.—Eclipse of Moon, Seasons.

Natural History.—Leaves of Trees and Plants (2 lessons: the first, general distinctions and similarities; the second, details of construction of leaves of each class), Classification of Animals (2 or 3 lessons: general distinctions—contrast of distinguishing features—details), Insects (a general lesson, with one insect taken as type), Anatomy of Human Body (2 lessons: the first on the skeleton; second on internal organs).

Mechanical Contrivances.—The Pump, Levers, an Electrical Machine, a Locomotive.

Easy Chemistry.—Oxygen, Hydrogen, Nitrogen.

Manufactures.—Silk (there might be a preparatory lesson on 'Silkworms'), a Lead Pencil, Glass, Starch, Leather, Porcelain, a Match.

The above are intended for boys from 10 to 12 years old.

7. If the following passage occurred in a reading-book, say what explanations you would think it necessary to give, and how you would ascertain that its meaning had been understood :—

'At the eastern end of the island was a small densely-wooded peninsula, with a thicket of under-brush so closely matted as nearly to prevent the possibility of seeing across it so long as the leaves remained on the branches. Near the narrow end that connected this acre with the rest of the island a small blockhouse had been erected. The logs were bullet-proof, squared and jointed with a care to leave no defenceless points; the windows were loop-holes; the door was heavy and small, and the roof was formed of hewn timber, covered carefully with bark to exclude the rain.'

Island and Peninsula. Definitions of these should be asked for, and a rough sketch of an island having a small peninsula at its eastern extremity should be drawn on the black-board.

Densely-wooded and *under-brush* should be contrasted, and 'under-brush' explained; also how the absence of the leaves made so important a difference. To ascertain whether this had been fully understood, the names of woods near home which might slightly resemble this should be asked for. *Near the narrow end.* Ask for geographical name for this—isthmus. *Bullet-proof*—because of their hardness and thickness. *Squared and jointed.* These terms should be explained, and then objects at school or home which were treated similarly asked for. *Loop-holes* — this term should be explained, and the reason why windows of glass and of larger size were not used should be deduced. The reason why and the manner in which the *bark* was placed on the roof should also be explained. It is not necessary to explain why all these precautions had been taken, as that would be evident from the context.

8. Describe the best exercises you know in English Composition, and the best way of correcting them.

In the lower classes Composition may be begun by requiring answers to common questions already known, to be written down in the form of sentences. The model answer may be written on blackboard, and children's answers corrected by moving quickly round the class and glancing at the slates or papers. In addition to this, Composition may be materially aided by requiring all answers to be given in sentences, and by instantly correcting and pointing out to the class all defective grammar and 'provincialisms' heard from the boys whilst in conversation with each other. In the upper standards, where Composition forms one of the subjects of instruction, the story should be read, or name of essay or character of letter to be written given, and a stated time in which to finish this should be allotted. The papers should afterwards be corrected by the teacher, and general mistakes shown and corrected on the blackboard. Each boy should also see his own paper and find out why everything marked is wrong. In the upper standards analysis of sentences greatly aids composition.

9. (*a*) What are the chief points to be kept in view in teaching the art of reading? (*b*) Name the advantages, if any, of exercises in silent reading in school.

(*a*) The chief points to be aimed at are to so instruct the child that he readily grasps the meaning of the passages to be read, without giving thought to the modes of spelling and other mechanical difficulties of the subject. Also, when he has acquired this, to teach him to read aloud in an intelligent manner, and so to modulate his voice and give expression to the matter read, that a bystander, without having a facsimile of what was being read, could without difficulty follow and understand. To do this the child must have *Accuracy of Pronunciation.* All provincialisms must be corrected, and frequent models given by teacher. With practice, the child may be taught to let his thoughts go ahead of his speech so that he gets an insight into the matter, and can read with *Fluency* and *Expression.*

(*b*) Silent reading may with advantage be allowed a few minutes at the commencement of the lesson, so that the children may become acquainted with the matter, and master all hard words. Difficulties in spelling may be also overcome in this way better than during individual or simultaneous reading. However, much of it tends to make a careless reader, and forms a habit of 'skipping,' and not getting a thorough insight into the matter to be read. Enough silent reading is also to be obtained at home, so that it is not desirable in school except as before stated.

10. Frame three sets of arithmetical questions suited for scholars in the fourth standard, so as to test knowledge of the reasons of rules as well as the power of applying them.

Set. I.—1. Find the cost of 508 sheep when the price of one is £3 16s. 9d.

2. Eight dozen and three men have £534 12s. divided equally amongst them. How much does each man get?

3. If I walk 3¾ mls., and for every yard walked have 3d., what is the amount of my money?

4. A family consumes 1½ pints of milk per day; what will the bill for the year amount to, supposing the milk to cost 1s. per gallon?

Set. II.—1. Find the cost of a fence round a square field each side of which measures 8 pls. 2¾ yards, when the fence costs 9¾d. per yard.

2. How much is the difference between 357d. and 593 half-guineas short of 8,563 crowns?

3. Find the 389th part of £6,534 18s. 6¾d.

4. Increase £89 15s. 0½d. 62 times.

Set. III.—1. George has £18 12s. 2d. Fred has 18 times the 7th part of George's money, and Jane has one-ninth as much as Fred. What have they altogether?

2. A field contains 8 ac. 15 pls. 2¾ yds. Find its cost at 8½d. per square yard.

3. £850 was taken at a concert, 225 people each paid half-a-guinea, 538 a florin, 189 a crown and a half, 334 paid 3s. each, and the rest 1s. How many people were in the shilling seats?

4. A boy's step measures 2 feet. How many steps will he take in performing a journey of 3 mls. 530 yds?

11. Describe the most healthful and useful exercises in drill which you have seen, and say how you would conduct them.

The most healthful kinds of drill for children are the "Physical Exercises and Extension Motions," performed either with or without dumb-bells. If dumb-bells are used, care must be taken that they are not too heavy for the children, or fatigue will follow the practices, and destroy the good effects to be derived. The children should be arranged in lines with sufficient room between them to allow of the practices to be performed without interference from each other. The teacher should stand in front slightly elevated, so as to be in full view of all the children, and should require them to imitate him as he performs each motion. Each motion should have a number given to it, which should be learned along with the motion, so that when a certain degree of proficiency has been arrived at, the motions may be performed by the scholars alone, the teacher simply giving the practice and the numbers, 'one,' 'two,' etc. Different practices may be devised to give exercises to all the muscles of the body. A pleasing deviation from counting is to have the practices performed to music.

12. State what use you have made of note-books and exercise-books as a pupil teacher, and how such books ought to be kept.

Note-books ought to be used for every subject studied, and in them summaries of chapters read, good points culled therefrom, rules, proofs, 'tips,' and everything worth remembering entered in a systematic form, so that the subject may be revised simply from the note-book.

Exercise-books are to be used for answers to questions given as tests, and when cleanly and carefully kept and well-marked by the tutor, form valuable keys to work which may and probably will need doing again. They should be dated and kept when full, and different books used for different subjects.

NEEDLEWORK.

Friday, July 7th, 2 to 4.

Directions to Candidates (to accompany material).

SECTION A.

Cut out in paper and make up, by tacking, a woman's gored flannel petticoat (half-size); and

Set in a calico patch, not less than two-and-a-half inches square. Mark the letters E, D (cross stitch). Or,

SECTION B.

Cut out in paper and make up, by tacking, an infant's long flannel (half size); and

Make up the enclosed piece of calico in the form of a woman's apron, showing hemming, seaming, gathering or pleating, stitching, and tuck-running.

(*Marks will be given for industry and finish.*)

FRENCH.—MEN AND WOMEN CANDIDATES.

Friday, July 7th, 4 to 6.

1. Translate into English:—

(*a*) Depuis lors, trois ans *s'écoulèrent* sans que Prascovie *osât* renouveler ses instances à ce sujet. Une longue maladie de sa mère la *contraignit* de renvoyer son projet à des temps plus favorables; cependant il ne passa pas un seul jour sans qu'elle *joignît* à ses prières ordinaires celle d'obtenir de son père la permission de partir, bien persuadée que Dieu l'exaucerait un jour.

Since that time three years elapsed without Prascovie daring to renew her entreaties on that subject. A long illness of her mother compelled her to defer her plan till a more favourable season; however, not a single day passed without her adding to her usual prayers that of obtaining permission from her father to set out, for she was fully persuaded that God would some day hear her prayer.

(*b*) A cette époque, ses traits étaient déjà fort altérés par l'étisie *prononcée* qui la minait sourdement; mais, dans cet état même de

dépérissement, il *eût été* difficile de trouver une physionomie plus agréable et surtout plus intéressante que la sienne. Elle était d'une taille moyenne, mais bien *prise ;* son visage, entouré d'un voile noir qui couvrait tous ses cheveux, était d'un bel ovale. Elle avait les yeux très noirs, le front découvert, une certaine tranquillité mélancholique dans le regard, et jusque dans le *sourire.*

At this time, her features were already much changed by the decided phthisis which was slowly undermining her ; but, in that very state of decline, it would have been hard to find a countenance more agreeable, and especially more interesting than hers. She was of medium height, but well proportioned ; her face, surrounded by a black veil, which enveloped all her hair, had a fine oval shape. She had very black eyes, and a high forehead, and there was a certain melancholy peace in her look, and even in her smile.

2. Parse the words printed in italics in the above extracts.

s' Reflex. Pron., 3rd Pers., Plur. Num., Masc. Gend., Obj. Case, gov. by '*écoulèrent.*'

écoulèrent (From *écouler.*) Reg. 1st Conj., Trans. Verb, Act. Voice, Preterite Tense, Ind. Mood, 3rd Pers., Plural Num., agreeing with "*ans.*"

osât (From *oser*). Reg. Trans. Verb (gov. '*renouveler*'), 1st Conj., Act. Voice, Imperf. Tense, Subj. Mood, 3rd Pers., Sing. Num., agreeing with '*Prascovie.*'

contraignit (From *contraindre.*) Irreg. Trans. Verb (gov. '*la*') 4th Conj., Act. Voice, Preterite Tense, Ind. Mood, 3rd Pers., Sing. Num., agreeing with '*maladie.*'

joignît (From '*joindre*'). Irreg. Trans. Verb (gov. '*elle*'), 4th Conj., Act. Voice, Imperf. Tense, Subj. Mood, 3rd Pers., Sing. Num., agreeing with '*elle.*'

prononcés Past Part. of '*prononcer.*' Reg. Verb, 1st. Conj., Sing. Num., Fem. Gend., qual. '*Étisie.*'

eût (From '*avoir*). Irreg. Aux. Verb, Act. Voice, Imperf. Tense, Subj. Mood, 3rd Pers., Sing. Num., agreeing with '*il.*'

été Past Part. of '*être.*' Irreg. Aux. Verb.

eût } (From '*être*'). Irreg. Intrans. Verb, Pluperfect
été } Tense, Subj. Mood, 3rd Pers. Sing. Num., agreeing with '*il,*' used impersonally.

prise Passive Past Part. of '*prendre.*' Irreg. Trans. Verb, 4th Conj., Sing. Num., Fem. Gend., qual. '*taille.*'

sourire Com. Noun, 3rd Pers., Sing. Num., Masc. Gend., Obj. Case, gov. by '*dans.*'

3. (i.) Give the feminine forms of sec, paysan, compagnon, poète ; the feminine of leurs voisins, tous mes amis ; the perfect indicative of s'en aller.

(ii.) Transcribe into the singular form (*a*) Ils ravagèrent tout le pays ; (*b*) Messieurs les généraux sont arrivés ; (*c*) Je voudrais qu'elles chantassent.

(i.)

Masculine.	*Feminine.*
Sec	Sèche
Paysan	Paysanne
Compagnon	Compagne
Poète	Poète
Tous mes amis	Toutes mes amies
Leurs voisins	Leurs voisines
Je m'en suis allé	Nous nous en sommes allés
Tu t'en es allé	Vous vous en êtes allés
Il s'en est allé	Ils s'en sont allés

(ii.)

Plural.	*Singular.*
(*a*) Ils ravagèrent tout le pays	Il ravagea tout le pays
(*b*) Messieurs les généraux sont arrivés	Monsieur le général est arrivé
(*c*) Je voudrais qu'elles chantassent	Je voudrais qu'elle chantât

4. Translate into French :—

The season advanced ; Prascovie was detained nearly eight days in a village by the snow, which fell in such quantities that the roads were impassable by foot-passengers. When they were sufficiently marked out by the sledges, she courageously prepared to continue her journey on foot ; but the peasants with whom she lodged dissuaded her, and made her see the danger of doing so.

(Piéton, traîneau, se disposer, loger.)

La saison avançait ; Prascovie fut retenue près de huit jours dans un village par la neige, qui était tombée en si grande abondance que les chemins étaient impracticable aux piétons. Lorsqu'ils furent suffisamment battus par les traîneaux, elle se disposait courageusement à continuer sa route à pied ; mais les paysans chez lesquels elle avait logé l'en dissuadèrent, et lui en firent voir le danger.

Latin.—Men and Women Candidates.

Friday, July 7, 4 to 6 p.m.

1. Translate into English :—

(*a*) Cæsar, primum suo, deinde omnium ex conspectu remotis equis, ut æquato omnium periculo spem fugæ tolleret, cohortatus suos prælium commisit. Milites, e loco superiore pilis missis, facile hostium phalangem perfregerunt : eâ disjectâ, gladiis destrictis, in eos impetum fecerunt. Gallis magno ad pugnam erat impedimento, quod, pluribus eorum scutis uno ictu pilorum transfixis et colligatis, cum ferrum se inflexisset, neque evellere neque sinistrâ impeditâ satis commode pugnare poterant, multi ut diu jactato brachio præoptarent scutum manu emittere et nudo corpore pugnare. Tandem, vulneribus defessi, et pedem referre, et, quod mons suberat circiter M. passuum, eo se recipere cœperunt.

Cæsar, having removed from sight first his own horse, then those of all his men, in order to make the danger of all equal, and to take away the hope of flight, having exhorted his soldiers, began the battle. The soldiers, having hurled their javelins from the higher ground, easily broke through the enemy's array ; and when they had put this to flight, they rushed upon them with drawn swords. It was a cause of great hindrance to the Gauls, during the fight, that when several of their shields had been pierced and pinned together by one stroke of the javelins, when the iron had become bent, they could neither pluck it out nor fight with enough advantage when their left arm was impeded. Thus many, having for a long time tossed about their arms, chose rather to cast their shields away from their hand, and fight without protection for their body. At length, worn out by wounds, they both begin to retreat, and also, since there was a mountain about a mile off, to betake themselves to it.

(*b*) Explain the construction of '*gladiis destrictis*' and '*impedimento*' in the above passage, and parse *cohortatus, defessi, cœperunt.*

'*Gladiis destrictis*' is equivalent to the Adverbial Sentence of Time, 'Quum gladios destrinxissent,' and is Ablative Absolute.

Impedimento. The Dative of Advantage, and the prior of two datives used with 'sum.'

Cohortatus. Depont. Verb (cohortor, hortari), 1st. Conj., Perf. Part., agreeing with the subject 'Cæsar' ; and governs 'suos.'

Defessi. Depont. Verb (de-fetisc-or, -fetisci, -fessus), 3rd Conj., Perf. Part., agreeing with subject (Galli).

Cœperunt. Indeterminate Verb, Act. Voice, 3rd Conj., Indic. Mood, Perf. T., 3rd Plur., agreeing with subject (Galli).

Or (and)

(*c*) Hæc cum animadvertisset, convocato consilio, omniumque ordinum ad id consilium adhibitis centurionibus, vehementer eos incusavit : primum quod aut quam in partem aut quo consilio ducerentur, sibi quærendum aut cogitandum putarent. Ariovistum, se consule, cupidissime populi Romani amicitiam appetîsse. Cur *hunc* tam temere quisquam ab officio discessurum judicaret? Sibi quidem persuaderi, cognitis suis postulatis atque æquitate conditionum perspectâ, eum neque suam neque populi Romani gratiam repudiaturum. Quod si, furore atque amentiâ impulsus, bellum intulisset, quid tandem vererentur? Aut cur de suâ virtute aut de ipsius diligentiâ desperarent?

When Cæsar observed these things, he called a council, and summoning to it the centurions of every rank, he reprimanded them sharply, chiefly because they supposed that it was their office to inquire and conjecture upon the direction or object of their march. [He said] that Ariovistus, when he (Cæsar) was consul, sought after the friendship of the Roman people with the greatest zeal. Why should anyone judge that he would so rashly swerve from his duty? He, for his part, was persuaded that when his demands had been heard, and the fairness of his terms observed, that he would refuse neither his nor the Roman people's favour. But if, driven by mad rage, he should wage war, what were they afraid of ; or why should they despair of his valour or foresight?

(*d*) What is meant by the '*oratio obliqua*'?

Oratio obliqua (Indirect Discourse) is the name given to a speech or statement which is reported, not in the actual words of the speaker, but in an indirect form introduced by some word of 'saying,' or 'feeling,' etc.

(*e*) Explain the use of the following pronouns in the above passage :—*hunc, sibi* (*quidem persuaderi*), *suis, eum, suam ;* and (*f*) parse *discessurum, intulisset, vererentur.*

(*e*) *Hunc* refers to Ariovistus, and cannot refer to the subject of the sentence.

Sibi can never be used except when it refers to the subject of the sentence.

Suis also refers to the subject.

Eum refers to Ariovistus. It always refers to some person other than the subject of the sentence.

Suam refers to Cæsar, or the speaker.

(*f*) *Discessurum.* Verb, Intrans., 3rd Conj., Act. Voice, (*Dis-ced-o, -ere, -cessi, cessum*), Fut. Partic., agreeing with subj. '*hunc.*'

Intulisset. Verb, Irreg., Trans., Act., 3rd Conj., (*In-fero, -ferre, -tuli, Illatum*), Subj. Mood, (verb of a subord. Sentence in 'Oratio Obliqua'), 3rd Sing., Plup. T., agrees with subject expressed in the verb.

Vererentur. Verb, Depont. (*Vereor, -eri, -itus*), 2nd Conj. Trans., Subj., (Verb of Sub. Sent. in 'Oratio Obliqua') Imperf., 3rd Plur., agrees with subject (*centuriones*).

2. Decline fully (*a*) '*felix ager*' (fertile field), (*b*) '*acer animus*' (a keen spirit).

		(*a*)	(*b*)
Sing.	N.	Felix ager	Acer animus
	V.	,, ,,	Acer anime
	Acc.	Felicem agrum	Acrem animum
	G.	Felicis agri	Acris animi
	D.	Felici agro	Acri animo
	Abl.	Felici *or* -e agro	Acri animo
Plur.	N.V.	Felices agri	Acres animi
	Acc.	Felices agros	Acres animos
	Gen.	Felicium agrorum	Acrium animorum
	Dat.	Felicibus agris	Acribus animis
	Abl.	,, ,,	,, ,,

3. Decline (*a*) *ego*, (*b*) *ille*, and (*c*) *qui* (singular and plural).

		(*a*)	(*b*) M.	F.	N.
Sing.	N.V.	Ego	Ille	Illa	Illud
	Acc.	Me	Illum	Illam	Illud
	Gen.	Mei	Illius		
	Dat.	Mihi	Illi (Olli, Poetical)		
	Abl.	Me	Illo	Illa	Illo
Plur.	N.V.	Nos	Illi (olli)	Illæ	Illa
	Acc.	Nos	Illos	Illas	Illa
	Gen.	Nostri (nostrum)	Illorum	Illarum	Illorum
	Dat.	Nobis	Illis (Ollis, Poetical)		
	Abl.	Nobis	Illis (,, ,,)		

'*Ego*' in poetry has Dative Sing. 'Mihi' or 'Mi.'

		(*c*)		
Sing.	N.V.	Qui	Quæ	Quod
	Acc.	Quem	Quam	Quod
	Gen.	Cujus		
	Dat.	Cui		
	Abl.	Quô	Quâ	Quô
Plur.	N.V.	Qui	Quæ	Quæ
	Acc.	Quos	Quas	Quæ
	G.	Quorum	Quarum	Quorum
	D. & Abl.	Quibus	(In poetry, Quis)	

4. Give the numerals, cardinal and ordinal, from one to twenty.

Cardinals.	*Ordinals.*
1. Unus	Primus
2. Duo	Secundus or Alter
3. Tres	Tertius
4. Quattuor	Quartus
5. Quinque	Quintus
6. Sex	Sextus
7. Septem	Septimus
8. Octo	Octavus
9. Novem	Nonus
10. Decem	Decimus
11. Undecim	Undecimus
12. Duodecim	Duodecimus
13. Tredecim	Tertius decimus
14. Quattuordecim	Quartus decimus
15. Quindecim	Quintus decimus
16. Sedecim	Sextus decimus
17. Septemdecim	Septimus decimus
18. Duodeviginti	Duodevicesimus
19. Undeviginti	Undevicesimus
20. Viginti	Vicesimus

5. Make as full a list as you can of the prepositions which govern (*a*) the accusative, and (*b*) ablative respectively.

(*a*) GOVERNING ACCUSATIVE.

Ante, apud, ad, adversus, circum, circa, citra, cis, contra, intra, erga, extra, infra, inter, juxta, ob, penes, pone, post, præter, prope, propter, per, secundum, supra, versus, ultra, trans.

(*b*) GOVERNING ABLATIVE.

A, ab, absque, coram, de, palam, clam, cum, ex or *e, sine, tenus, pro, præ.*

(*c*) *In, sub, super,* and *subter* may govern either case: when do they govern the accusative and when the ablative?

In, sub, super, subter, govern the Accusative when they imply *motion to,* and the Ablative when they imply *rest at* a place.

6. (*a*) Who were the Helvetii, and who was Ariovistus? (*b*) In what year did Cæsar arrive in Gaul? (*c*) How long did he stay there, and what other country did he invade during that time?

(*a*) The Helvetii were inhabitants of that part of Gaul which is now called Switzerland.

(*b*) Ariovistus was the king of Germany.

(*c*)(**α**) Cæsar arrived in Gaul in B.C. 58, and remained until 52 B.C.

(**β**) He invaded Britain (twice) and Germany during this period.

DOMESTIC ECONOMY.—WOMEN ONLY.

Friday, July 7th, 10 to 12.30.

Candidates are not allowed to answer more than *one* question in each section.

If you answer more than one question in each section, only the first answer in each will be revised.

SECTION I.

1. Briefly describe the garments you would think most suitable to be made by children in the upper standards attending a rural school; state the materials of which the garments should be made, and the approximate cost of each article.

The garments chosen must of course be such as will show the stitches required for Schedule III. of Code. They should also be suitable for the children's own wear.

The following are examples—

	s.	d.
A Chemise.—2 yards of grey or white calico at 4d. or 5d. per yard - - - - - - - - - -	0	10
(This must be made with an opening in the front to show *button-hole.*)		
Drawers.—1½ yards of grey or white calico, same as above - - - - - - - - - -	0	7½
Night-dress.—3 yards of grey or white calico - -	1	3
Boy's night shirt.—2½ yards of calico - - -	1	0½
Baby's night-dress.—2 yards of calico - - -	0	10
Petticoat, with band.—2¼ yards of skirt material at about 10d. per yard, and ½ yard of grey calico for band at 4d. - - - - - - - - - -	2	0½
Child's pinafore.—1 yard of muslin, holland, or print; or with sleeves, 1½ yards. Cost about 6d. or 8d. per yard - - - - - - - - - -	1	0
Girl's or Woman's Apron.—1½ yards of holland at 8d.	1	0

2. What would you consider a suitable stock of house-linen for a young teacher (unmarried) living in a small house of her own? State the material and average cost of each article.

	s.	d.
1. *Table-cloths.*—Three would be required. Two unbleached, 3s. each; one (at least) white one, Queen's Household, sold by the yard, or ready cut linen cloths, 4s. 6d. - - - - - - - - - -	10	6
2. *Table napkins.*—Half-a-dozen, linen - - -	3	0
3. *Tea,* and *glass-towels.*—Half-a-dozen - - - (Flax or coarse linen.)	2	6
4. Two pairs of *Sheets.*—White Bolton sheeting, which is sold in pairs of the required size, or 10 yards of double width twill calico, at 1s. a yard (about) -	10	0
5. Four *Pillow-slips.*—Two bolster-slips, 12 yards of calico at 6d. - - - - - - - - - -	6	0
6. Two white *Counterpanes* - - - - - -	10	0
7. Six *Bed-room towels.*—Huckaback, or honeycombed towelling; one Turkish towel may be added to or included in the number - - - - - -	4	0

Note.—The linen here named supplies just a change only. The multiplication of these articles will depend on the length of interval between the washing days.

Section II.

1. Describe the best method of establishing and conducting a school savings bank.

The best means of establishing and conducting a school savings bank is to enlist the aid of the teaching staff.

The deposits should be received, if possible, on the Monday morning in much the same manner as the school pence, and with consistent regularity. Parents and scholars should be encouraged to deposit at least the threepence per week per child saved by them under the provisions of the Assisted Education Act.

If some small premium could be added, apart from interest, for regularity, *not amount*, of deposit, the movement would receive a helpful stimulus.

It would be well to connect this effort with the Post Office Savings Bank, so that the children may be taught to save in connection with this national organization after their school days are over.

Every week the total receipts should be deposited in the Post Office Savings Bank, just as if by a single depositor.

2. A pupil teacher, whose salary is £15 per annum, lives with her parents, who provide her with food and lodging free of cost, but with nothing else. How can she best use her income?

The £15 would probably be best used as follows :—

	£	s.	d.
Clothing	6	10	0
Books	2	0	0
Savings	2	12	0
Holidays	2	0	0
Pocket Money and Amusements	1	8	0
Benevolence and Sundries	0	10	0
	£15	0	0

3. Define 'Immediate Annuities' and 'Deferred Annuities,' and state as nearly as you can, the value of an immediate annuity, which a woman, fifty years of age, can purchase for £100.

Annuities are annual payments made during the life of a certain person or persons.

As a matter of business an annuity is always purchased for a consideration, and may be immediately payable, payable after a certain date, or payable upon a particular person reaching a certain age.

Thus a woman aged 50 years may purchase an *immediate annuity* with £100, and will thus at once during her life receive yearly a little more than £6.

Deferred annuities are those that do not at once become recuperative after the consideration is paid.

Section III.

1. i. In what different ways can potatoes be cooked?

ii. Describe the way which you regard as the most economical.

i. Potatoes may be (*a*) plain boiled ; (*b*) partially boiled, the water poured away, and then, with the lid on the saucepan, finished in the steam ; (*c*) brought to the boil, cut in halves, placed on the flat side in a baking tin, brushed over with dripping, and baked ; (*d*) roasted or baked with their skins on ; (*e*) parboiled, sliced and fried ; (*f*) steamed.

ii. One of the most economical modes is the one described (*c*) ; another is 'boiling them in their jackets.' Carefully wash the potatoes, using a brush if necessary ; place them in cold water, bring to the boil, add salt, and boil gently until tender. When ready for table nothing will be lost but the skin, and much nutriment which lies near the skin will be preserved. By this process also, the potatoes do not break in the water, and so get watery and wasted. Time to cook, about 25 minutes.

2. A leg of mutton, weighing 8 lbs., is purchased for a family of six persons. How would you provide three savoury dinners for the whole family from this joint?

Have the leg of mutton cut so that a good portion be left on the shank. Hang this up.

First dinner—Roast the mutton and serve as a joint ; or, Cut out of the best part of the joint 4 or 5 chops, cover with egg and bread crumbs, fry in clarified fat. Make the following soubise :—Boil an onion, chop finely, put it into a dry saucepan, mix with them an ounce of flour and 2 oz. of butter, add by degrees half a pint of milk, a little salt and pepper, and stir until the milk boils. Have ready also, boiled and cut into small balls, two carrots and one turnip. When all are prepared, place the cutlets round the dish ; heap the vegetables in the centre, and pour the soubise over the whole ; serve hot.

Second dinner—Boil the shank end of the mutton, and serve with caper sauce.

Third dinner—Make a vegetable soup with the stock from second dinner. Save a little of the stock if the meat was roasted to hash up the remains of first dinner.

If the soubise was chosen, then the remainder of the mutton may be made into an Irish Stew, a 'Haricot,' or 'Hot-pot.'

3. Enumerate the articles necessary for the proper cooking and saving of food in a labourer's cottage, with the cost of each.

	s.	d.
Saucepans, a set of three	5	0
Steamer, to fit middle size	1	6
Small boiling pot	2	0
A digester or stock pot (2 gallons)	4	6
Frying pan	0	10
An earthenware stew-jar, with lid	0	8
Four bread tins	2	0
Meat tin	0	8
Baking sheets, three or four	1	6
Cake tins, average each	0	6
Pudding basin	0	4
Pie dishes, each	0	4
Colander	0	8
Toasting fork	0	3
Meat jack 4s. 6d., or one may be improvised with a hook, 6d., and some string.		
Paste board and pin	1	6
Iron kettle	2	3
Small fish kettle, if it can be afforded	3	6
Bread and nutmeg graters ; brushes for greasing ; boxes for salt and pepper sprinkling ; stand for saucepans on table	1	0

Section IV.

1. Mention some frequent symptoms of influenza, and describe the treatment suitable to that complaint.

As influenza assumes all varieties of forms, its symptoms are exceedingly varied. Those common to all species are principally :—

(*a*) A considerable increase of temperature.
(*b*) A feeling approximate to light-headedness, and
(*c*) Great mental depression.

Generally speaking, a slow malarial fever exhibits many similar characteristics. The sufferer should be kept very quiet, and upon low diet, and in the initial stages should avoid any heating or stimulating food, although brandy has been moderately used with great effect during convalescence. If any approach to a hysterical tendency be manifested, a moderately strong dose of quinine is beneficial.

During recovery great care must be taken to prevent a relapse, as there is scarcely any complaint so subject to recoil in its later stages, and so fatal in its results should any check take place.

2. (A) Why is the proper ventilation of a bed-room more important than that of a sitting-room? (B) What should be the bed-room's temperature, and (C) how should it be maintained?

(A) The proper ventilation of a bed-room is more important than that of a sitting-room, because :—

(*a*) It is occupied continuously for a greater length of time.
(*b*) It is not casually ventilated by persons passing in and out.
(*c*) Fires, which are a means of ventilation, are not so frequent in bedrooms as sitting-rooms.
(*d*) Bodily exhalations are more constant and profuse.
(*e*) There are more hangings and draperies in a bed-room to harbour germs of infection or contagion.

(B) The fundamental principle with respect to the temperature of a bed-room is that it should be from five to ten degrees lower than that of the sitting room, for too high a temperature induces sleeplessness or restive and non-refreshing slumber. The temperature of a bed-room should never pass beyond the range of from 60° to 62°.

(C) This degree of heat should be maintained by means that does not vitiate the air. If the hot cylinder connected with the bath and the linen closet be adjacent to the bed-room, this is often sufficient, and is excellently adjusted. For as this cylinder, heated from the kitchen fire, becomes cooled, so does the occupancy of the bed-room increase in warming efficiency.

3. (A) Mention any provisions of the Code for the maintenance of health in elementary schools, and (B) describe the precautions which you would take on the appearance of infectious disease.

(A) *Article* 85 provides that the department must be satisfied that the schools are (*a*) healthy, (*b*) properly constructed, lighted,

warmed, cleaned, drained, and ventilated; (*c*) of sufficient accommodation for the scholars attending, and (*d*) provided with suitable offices.

There must be in schools *already established* 8 sq. ft. of internal area, and 80 c. ft. of internal space for every unit of average attendance.

For *new* schools the requirements must be in accordance with Schedule VII. (which is much too detailed to be here quoted), wherein very elaborate regulations are given under the heads of (*a*) accommodation, (*b*) schoolrooms, (*c*) walls, floors, and roofs, (*d*) entrances, (*e*) cloak-rooms, (*f*) class-rooms, (*g*) halls, (*h*) windows, (*i*) staircases, (*j*) ventilation, (*k*) warming, (*l*) sanitary arrangements, (*m*) desks, and (*n*) sites and play-grounds.

(B) The chief precautions to be taken on the appearance of any infectious disease are :—

(*a*) To report to the medical officer every case.

(*b*) To request the M.O. to visit the school and examine every child.

(*c*) To consult the M.O. in gravely extended epidemics as to closing the school.

(*d*) To thoroughly disinfect all the premises, and especially the offices, with some such specific as Condy's Fluid.

(*e*) To ascertain the reason of every absence, and carefully watch every case of indisposition.

(*f*) To give as much playtime, holidays, etc., as are possible, and to lighten the mental work, and afford opportunity for the increase of bodily vigour.

(*g*) To furnish an extra supply of fresh air and water, and to frequently flush the rooms with the former, and the drains with the latter.

(*h*) To scrupulously avoid contact with any infected area, and to quarantine whole families if only one member be affected.

1. (*a*) What are the chief materials of which clothing is made? (*b*) Which of these is the most essential in our climate, and why?

(*a*) The chief materials out of which clothing is made are wool, fur, leather, silk, from animal sources, and linen and cotton from vegetable sources.

(*b*) Wool is the most essential clothing material for the climate of England, as it is (α) more porous than either cotton or linen and (β) also more absorbent, whilst (γ) it is also a worse conductor of heat.

Its porosity allows the waste products of the body to escape in the form of perspiration, its absorbency causes the evaporation of these products to take place from the surface of the wet wool rather than from the skin itself, and its non-conductivity prevents the too great or sudden loss of heat. In this variable climate the properties of wool therefore are adapted in some measure either to hot or cold weather, and minimise the effects of sudden changes of temperature.

2. Give a list (with cost) of the articles of wearing apparel required for a female teacher about to enter a training college.

A good stock of under linen, stockings, and good boots should be the first care of any one preparing to leave home. The amount of outer clothing will depend on the means and taste of her parents, and may be added to from time to time. We shall give therefore only the amount of those really necessary for wear right away.

	£	s.	d.
(*a*) *Dresses*—(1) A cashmere, or other good double-width material—with linings, trimmings, and making - - - - - - - - about	1	15	0
(2) A beige, or homespun, for daily wear - -	1	10	0
(3) A walking-out dress, of warm material in winter, as cloth or serge, to be replaced by a lighter material in summer - - - - - -	1	10	0
(*b*) *Jacket*—or cape for walking (thick) - -	1	10	0
Lighter one - - - - - - - -	0	18	0
Mackintosh or circular cloak - - - -	0	15	0
Wrap or shawl, for general use (probably a knitted one) - - - - - - - - -	0	8	6
(*c*) Best *hat* or bonnet - - - - - -	0	15	0
Walking hat - - - - - - - -	0	10	0
Garden hat - - - - - - - -	0	3	6
(*d*) *Gloves* : Kid 2s. 6d., silk or taffeta 1s. 4d. -	0	3	10
(*e*) *Umbrella*, which should be a good one - -	0	7	6
(*f*) *Stockings*. No limit to the number. Each pair will cost about 2s. in wool, and should be knitted ones.			
(*g*) At least three pairs of boots—two strong enough for out-door wear - - - per pair	0	8	6
One pair house-boots - - - - - -	0	4	6
A pair of slippers (bed-room) - - - -	0	2	6
A pair of tennis shoes - - - - -	0	3	6
(*h*) *Underclothing*.—Flannel for vests and petticoats, one dozen yards at 1s. 2d. per yard - -	0	14	0

Will make three vests and two petticoats.

Two dozen yards of Horrocks' long cloth will make three sets of underlinen. A good calico will cost 6s. 6d. per dozen. Any trimming, whether bought or made, will be extra.

A dressing cape or jacket, and dressing-gown, flannel - - - - - - - - - - 0 5 0

3. What kind of water is best (*a*) for drinking, (*b*) for cooking, (*c*) for washing? (*d*) How would you make hard water suitable for washing clothes, and (*e*) what is the chemical process involved?

(*a*) Good water *for drinking* should have no colour or turbidity, no taste or smell. It should contain no organic matter—vegetable or animal—no metallic impurity, nor a very large amount of mineral matter. The most harmful impurities are sewage matter and lead.

(*b*) Water *for cooking purposes* should be soft and perfectly pure, otherwise, even if positively harmful results are avoided, the food boiled, etc., often becomes either insipid or impregnated with a disagreeable flavour.

(*c*) Water *for washing* should be free from metallic impurities and lime.

(*d*) Hard water may be softened on a small scale by the use of soda, soap, and washing powders, and on a large scale by the adoption of Clark's process, which is as follows :—

The water is mixed with lime water in a tank and allowed to settle. The lime water combines with the carbonic acid gas present in hard water, forming with it calcium carbonate, which sinks to the bottom, as also does the original calcium carbonate held in solution by the carbonic acid gas now removed.

By this method the hardness of the water at Canterbury is reduced from 23½ to 8½ grains per gallon, and a great saving of soap, etc., results.

IMPORTANT NOTICES.—The usual Routines will commence next month.

For Correspondence see end of Certificate Article.

SELECTED GOVERNMENT QUESTIONS.

FIRST WEEK.

1. Write a short essay on one of these subjects :—
   (*a*) Holidays, and how to use them.
   (*b*) Parliament.
   (*c*) Tragedy and Comedy.

2. Analyse the following :—

'Fair laughs the morn, and soft the zephyr blows,
While proudly riding o'er the azure realm,
In gallant trim the gilded vessel goes,
Youth on the prow and pleasure at the helm,
Regardless of the sweeping whirlwind's sway
That hushed in grim repose, expects his evening prey.'

3. Draw an outline map with lines of latitude and longtitude of (*a*) The English Channel, (*b*) The Basin of the Mississippi, or (*c*) Africa south of 20° south latitude.

4. Indicate, under appropriate heads, the matter with which you would deal in a full lesson to a class on either Australia *or* Italy.

5. Name three English kings who fell greatly under the influence of favourites, and show how the weakness of these kings contributed to the growth of constitutional freedom.

6. What do you know of Margaret, the Maid of Norway; the battle of Pinkie; the Rye House Plot?

7. Write out full notes of a lesson on *one* of these topics :—(*a*) The Seasons; (*b*) Adjectives, Adjective phrases, and Adjective sentences; (*c*) The use of laws, and (*d*) (*for Infants*) A shilling.

8. What sort of decoration is most appropriate in a schoolroom, and most likely to make it bright and attractive to the scholars?

9. Explain the meaning of the following terms :—*Legato, Dal Segno, Sforzando, Ad libitum, Allegretto, Fortissimo.*

10. (*a*) How would you explain long division to a class of children who have worked sums in short division? (*e.g.*, 403÷19).
Ans. 21 4/19.

(*b*) By what method would you enable children to ascertain whether a given number is prime? (*e.g.*, 163.) Ans. *not prime.*

11. Multiply 6·36 by ·571428, and give the answer in decimals.
Ans. 3·63.

12. (*Men only.*) (*a*) If two straight lines cut one another, the vertical or opposite angles shall be equal.

(*b*) If T be the middle point of the diagonal QS of a quadrilateral PQRS whose opposite sides are equal, then P, T, R, are in a straight line.

(*Women only.*) Calico, flannel, and linen are extensively used in underclothing: give some account of the way in which these materials are produced. What considerations should guide you in selecting flannel for an infant's garments, and for men's shirts?

13. (*Men only.*) Solve the equations:—

(*a*) $\frac{2x+7}{5} - \frac{25-x}{2} = \frac{7x-5}{32} + 2$. Ans. $x = 19$.

(*b*) $\frac{2}{x} + \frac{3}{y} = 31$; $\frac{5}{y} - \frac{7}{x} = 31$. Ans. $x = \frac{8}{93}, y = \frac{12}{31}$.

(*Women only.*) A useful outfit has to be provided for a school girl 14 years of age who is going into domestic service as a nurse-maid. State what garment you would give her, the kind and amount of materials to be used in each garment, and the cost (in detail) of the outfit.

14. (*Men only.*) Solve the equation:—

$$\frac{2x}{51-2x} + \frac{68-3x}{x} = 3.$$ Ans. $x = 17$ or $14\frac{4}{7}$.

(*Women only.*) By what means could you make worn sheets and table cloths fit for further use, or how could you otherwise utilize them?

15. (*Men only.*) The sum of the sides of a triangle is 24 feet; one side is 8 feet long, and the area of the triangle is 24 square feet. Find the length of the two other sides.

Ans. 10 feet, 8 feet, 6 feet.

(*Women only.*) State fully the Needlework requirements of the Code for 4th year of apprenticeship.

Second Week.

1. Paraphrase the following passage:—

> 'I do remember *me*, that in my youth,
> When I was wandering, upon such a night
> I stood within the Colosseum's wall,
> 'Midst the chief relics of almighty Rome;
> And thou didst shine, thou rolling *moon*, upon
> *All this*, and *cast* a wide and tender light
> Which softened *down* the hoar austerity
> Of rugged desolation, and filled *up*,
> *As 't were anew*, the gaps of centuries,
> Leaving that beautiful which still was so,
> And making that which was *not*.'

2. Parse the words printed in italics in the above extracts.

3. Account for the phenomenon of the midnight sun, and for the prevailing westerly winds in the temperate parts of the Atlantic and Pacific Oceans.

4. What information would you give in a lesson on
(*a*) The mountains and plains of Europe, *or*
(*b*) The lakes and rivers of British North America?

5. State in a few words what you know of any five of the following:—*Doomsday Book, Scutage, Hampton Court Conference, The Chartists, Poyning's Law, The Exclusion Bill, Letters of Junius, Mutiny Act.*

6. Arrange in chronological order and give dates of the following:—Death of King Alfred, Landing of the Pilgrim Fathers, The Black Death, Founding of Pennsylvania, Battle of Sedgemoor, Defeat of the Armada, Treaty of Wallingford, Treaty of Troyes.

7. Say what is the use, to a Pupil-Teacher, of keeping a diary of employments or notes of lessons given: describe such a record.

8. Say what sort of pictorial or other visible illustration you would use in teaching the elements of arithmetic to very young children, and show what use you would make of such illustrations.

9. State the key of each of the following passages:—(*a*) C, A, E♭, G, B♭, F, D, C; (*b*) F♯, A, E, G, F♯, D, C♯, G; (*c*) B♭, F, A♭, E♭, D♭, G, C, B♭, E♭, G, B♭, OR

Which one of the following notes is highest in pitch, and which lowest:—

f in Key A, **l** in Key G, **s** in Key B♭, **t** in Key C, **l** in Key A♭, **d** in Key D.

10. (*a*) Explain the method of forming the remainder in short division by a composite number.

Take as an example 4,876 ÷ 105.

At what step in the division of money is the same principle illustrated?

(*b*) Is it rational to divide or multiply one concrete number by another? Illustrate by these examples.

Find the number of half-crowns in £3 7s. 6d.

Find the price of 5 yards 2 feet 6 inches of silk at 4s. 6d. per yard. Answers. $46\frac{A}{105}$; 27; £1 6s. 3d.

11. Find the rate per cent. per annum at which £314 12s. 6d. will amount to £346 1s. 9d in $2\frac{3}{4}$ years at simple interest.

Ans. $3\frac{3}{4}$ per cent.

12. (*Men only.*) (*a*) To describe a square on a given straight line.

(*b*) Find a point in the diagonal produced of a square, from which, if a line be drawn parallel to any side of the square, meeting another side produced, it will form, with the produced diagonal and produced side, a triangle equal to the given square.

(*Women only.*) Describe the principal articles of clothing made by hand-knitting, and show, by your statements, that instruction in the subject is of value to children in their school and home life.

13. (*Men only.*) (*a*) Write down the factors of $x^8 - y^8$; $x^3 - 3x^2 + 3x - 1$; and $x^2 + 8x - 105$.

Answers. $\frac{(x^4+y^4)(x^2+y^2)(x+y)(x-y)}{(x-1)^3;(x+15)(x-7)}$.

(*b*) Find the value of $(a+b)^2 + (b+c)^2 + (c+a)^2$ when $a = -1, b = -2, c = 3$. Ans. 14.

(*Women only.*) What are the chief precautions to be observed in the selection of materials for clothing? Show by a statement of particulars what would be the probable cost of a suitable winter outfit for a Pupil Teacher.

14. (*Men only.*) (*a*) Reduce to lowest terms

$$\frac{x - 8x^2 + 15x^3}{x - x^2 - 20x^3}.$$ Ans. $\frac{1-3x}{1+4x}$.

(*b*) Reduce to lowest terms

$$\frac{(a+b+c)^2 + (a-b)^2 + (b-c)^2 + (c-a)^2}{a^2+b^2+c^2}.$$ Ans. 3.

(*Women only.*) Name and describe some of the common washing-machines in use. What articles must always be washed by hand, and what without soap, and why?

15. (*Men only.*) Find the cost of painting a dog-kennel 5 feet long, 2 feet wide, each side being 2 feet high, and the perpendicular height of the ridge of the roof from the ground being $3\frac{1}{2}$ feet, at 3d. per square foot. (Exclude bottom.) Ans. 14s. 1d.

(*Women only.*) Describe the method of cutting out and putting together a child's pinafore, showing what stitches would be required.

Third Week.

1. State how you may know by the spelling of certain words that they are probably derived from the Greek Language. Give some examples.

2. Explain the origin and the precise meaning of six of the following words and put each of them in a sentence:—

Telephone, Tripartite, Omniscient, Innumerable, Recompense, Philosopher, Quadrilateral, Comprehension, Prosecute, Simulate, Illicit, Cohesion, Legislate.

3. Enumerate the chief colonies of Gt. Britain, and state how each was acquired.

4. Explain the cause of the tides, and give particulars of any abnormal tides.

5. State shortly the main objects of the foreign policy of Henry VIII., and William III.

6. What were the chief causes of the revolution of 1689?

7. Give some simple rules showing the best way of conducting a class lesson in writing.

8. Describe the method you adopt in teaching '*Singing by note*' to a class of beginners.

9. Transpose the following passage a major second higher, viz., into the key of G:—

F, A, G, F, D, C, B, B♭, A, F, E♭, D, E, F, OR

Re-write the following passage, making a change to the first sharp key at (*a*) and a return to the original key at (*b*):—

(*a*) (*b*)

s d r t₁ m fe l s fe t d' fe s r f t₁ d

10. Reduce $(4\frac{3}{5} + 9\frac{1}{12} - 10\frac{4}{5} - \frac{A}{117})$ of 5s. $7\frac{1}{2}$d. to the fraction of $\frac{\frac{5}{8} - \frac{3}{7}}{\frac{3}{5} - \frac{A}{14}}$ of 9s. 4d. Ans. $\frac{1}{2}$.

11. (*a*) How would you explain to beginners in fractions that the value of a fraction is not altered by multiplying the numerator and denominator by the same number?

(*b*) Define proportion, and give a simple method for showing that the product of the extremes is equal to the product of the means.

12. (*Men only.*) (*a*) In obtuse-angled triangles if a perpendicular be drawn from either of the acute angles to the opposite side produced, the square on the side subtending the obtuse angle is greater than the squares on the sides containing the obtuse angle by twice the rectangle contained by the side on which, when produced, the perpendicular falls, and the straight line intercepted without the triangle between the perpendicular and the obtuse angle.

(*b*) If one angle of a triangle be four-thirds of a right angle, the square on the side subtending that angle is equal to the sum of the squares on the sides containing it together with the rectangle contained by those sides.

(*Women only.*) How would the sum of £20 be most properly expended in furnishing a labourer's cottage containing three rooms?

13. (*Men only.*) A train 200 yards long passes another train 240 yards long, moving in opposite directions on parallel lines, in 12 seconds. If they had been moving in the same direction they would have cleared each other in one minute. Find the rate per hour of the two trains. Ans. 30 miles, 45 miles per hour.

(*Women only.*) Name and describe the early symptoms of some of the most common contagious and infectious diseases. What are the cheapest and most efficacious disinfectants?

14. (*Men only.*) (*a*) Resolve $(a+b+c)^2-(a-b-c)^2$ into factors. Ans. $4a(b+c)$.

(*b*) Divide $m^3+n^3-8r^3+3mn^2+3nm^2$ by $m+n-2r$.
Ans. $m^2+n^2+2mn+2mr+2nr+4r^2$.

(*Women only.*) Explain the bearing upon a healthy condition of the body of (*a*) keeping early hours, (*b*) taking regular exercise, (*c*) cleanliness, (*d*) suitable and sensible dressing, and (*e*) good temper.

15. (*Men only.*) (*a*) Prove the rule for the multiplication of two algebraical fractions.

(*b*) Simplify $\dfrac{a^2+b^2}{a^2-b^2}-\dfrac{1}{\dfrac{2a}{2a-b}-\dfrac{2b}{2b-a}}$

Ans. $\dfrac{5ab}{2(a+b)(a-b)}$.

(*Women only.*) Which is the most important of the condiments generally in use, and why? Name and describe some other common condiments, and show what purposes they serve.

16. (*Men only.*) A quadrilateral field has two sides parallel to one another whose lengths are 8 chains 15 links and 10 chains 5 links, and the perpendicular distance between them is 6 chains. Find the area and the rent of the field at £2 5s. per acre.

(*Women only.*) Give directions suitable to a class of younger children, for (*a*) sewing on a string, (*b*) sewing on a button, (*c*) knitting a pair of plain muffatees (two needles).

FOURTH WEEK.

1. Take any two of the following writers and say who and what he was, when he lived, and what he wrote:—*Hume, Dryden, Burke, Wordsworth.*

2. What is meant by a '*figure of speech*'? Give some examples of the use of *figurative language* from poems you have read.

3. Name (*a*) any points where the Equator cuts Asia, America, and Africa; also (*b*) any places of importance situated on or very near the 30th N. parallel, the 30th S. parallel, the 30th E. meridian, the 90th E., the 60th W., and the 90th W.

4. Give a summary of what you know about India under these heads:—(*a*) approximate size, (*b*) climate, with especial reference to rainfall in different parts, (*c*) mountains.

5. In what parts of Britain did the Saxons, the Angles, and the Jutes settle? What were the chief battles fought by Alfred against the Danes? Trace the descent of Edward the Confessor from Egbert.

6. What effect had the French revolution upon Pitt, Burke, Fox?

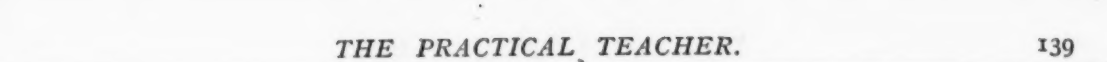
7. What are the best expedients you know for reviving the attention of a languid or disorderly class?

8. Give a summary of the requirements of the Code in the subject of Geography for the several standards.

9. Write the pitch names (C, B, etc.) and the duration names (crochet, etc.) of the following notes, and write the signs for rests of corresponding value:

OR

Re-write the following: (1) doubling the value of every note and rest, and (2) again, halving the value of every note and rest:



10. A man buys a flock of 117 sheep for £248 12s. 6d.; he loses 4, and finds 24 others so sickly that he must sell them at once for 10s. apiece less than he gave for them; at what price per head must he sell the rest to gain £24 by the transaction?
Ans. £2 12s. 6d.

11. How far may I travel in a coach which goes at the rate of 8 miles per hour, starting at 10 a.m., in order to return on foot to the starting place at the rate of $3\frac{1}{3}$ miles per hour by 32 min. past 2 p.m.? Ans. $10\frac{2}{3}$ miles.

12. (*Men only.*) (*a*) If one side of a triangle be produced, the exterior angle is equal to the two interior and opposite angles; and the three interior angles of every triangle are equal to two right angles.

(*b*) PQ, PR, the equal sides of an isoceles triangle PQR are produced to S and T so that PS, PT are equal. RS, QT intersect in M. If the angle SQT is equal to the angle PQR, then the angle SMQ is equal to twice the angle QPR.

(*Women only.*) Describe the best forms of thrift (1) to be recommended in lessons to school children, (2) to be adopted by the teacher herself. Give reasons for your answer.

13. (*Men only.*) (*a*) Write down the sum of the roots of the equation $ax^2+bx+c=0$.
Ans. $-\dfrac{b}{a}$.

(*b*) Solve $\dfrac{4x}{5}-3\left(\dfrac{2x-1}{2x+1}\right)=3-\dfrac{1-8x}{10}$. Ans. $x=\dfrac{1}{118}$.

(*Women only.*) Mention some of the most wholesome and economical modes of cooking meat, and specify the time required for each process. How may the juices of meat be best preserved? What uses can be made of dripping?

14. (*Men only.*) Solve:—

$$\frac{5x}{3}-44=\frac{3y}{4};\ \frac{2x}{13}+\frac{4y}{7}=22.$$ Ans. $x=39;\ y=28$.

(*Women only.*) Mention the necessary ingredients of nourishing food and the special purpose served by each constituent. Compare the advantages and defects of each of the following articles of food (*a*) fish, (*b*) lean beef, (*c*) cheese, and (*d*) potatoes.

15. (*Men only.*) The area of the space between two concentric circles is 1,078 square feet, the radius of the larger circle being 28 feet. Find the radius of the inner circle ($\pi=\frac{22}{7}$). Ans. 21 ft.

(*Women only.*) Give directions for cutting out a baby's frock.

SEPTEMBER, 1893.

Practical Teacher Coupon.

*Name*_____

*Address*_____

*Pseudonym (if any)*_____

IN FUTURE

EVERY QUERY

Of whatever nature must be accompanied by the above Coupon.

L'AVARE.

(*Molière.*)

TRANSLATED BY PROFESSOR DARQUÉ.—(*Author of 'Pupil Teachers' French Course.'*)

L'AVARE.

FROSINE. Vous moquez-vous? Vous n'avez pas besoin de cela, et vous êtes d'une pâte à vivre jusques à cent ans.

HARPAGON. Tu le crois?

FROSINE. Assurément. Vous en avez toutes les marques. Tenez-vous un peu. Oh! que voilà bien, entre vos deux yeux, un signe de longue vie?

HARPAGON. Tu te connais à cela?

FROSINE. Sans doute. Montrez-moi votre main. Ah, mon Dieu! quelle ligne de vie!

HARPAGON. Comment?

FROSINE. Ne voyez-vous pas jusqu'où va cette ligne-là?

HARPAGON. Eh bien, qu'est-ce que cela veut dire?

FROSINE. Par ma foi, je disais cent ans; mais vous passerez les six-vingts.[139]

HARPAGON. Est-il possible?

FROSINE. Il faudra vous assommer, vous dis-je; et vous mettrez en terre et vos enfants, et les enfants de vos enfants.

HARPAGON. Tant mieux. Comment va notre affaire?

FROSINE. Faut-il le demander? et me voit-on mêler de rien dont je ne vienne à bout? J'ai, surtout pour les mariages, un talent merveilleux. Il n'est point de partis au monde que je ne trouve en peu de temps le moyen d'accoupler; et je croi, si je me l'étais mis en tête, que je marierais le Grand Turc avec la république de Venise. Il n'y avait pas, sans doute, de si grandes difficultés à cette affaire-ci. Comme j'ai commerce[140] chez elles, je les ai à fond l'une et l'autre entretenues de vous; et j'ai dit à la mère le dessein que vous aviez conçu pour Mariane, à la voir passer dans la rue et prendre l'air à sa fenêtre.

HARPAGON. Qui a fait réponse . . .

FROSINE. Elle a reçu la proposition avec joie; et quand je lui ai témoigné[141] que vous souhaitiez fort que sa fille assistât ce soir au contrat de mariage qui se doit faire de la vôtre, elle y a consenti sans peine, et me l'a confiée pour cela.

HARPAGON. C'est que[142] je suis obligé, Frosine, de donner à souper au seigneur Anselme; et je serai bien aise qu'elle soit du régal.

FROSINE. Vous avez raison. Elle doit après dîner rendre visite à votre fille, d'où[143] elle fait son compte d'aller faire un tour à la foire, pour venir ensuite au souper.

THE MISER.

FROSINE. Are you joking? You have no need of that; and you are made of a stuff that will live to a hundred.

HARPAGON. Do you think so?

FROSINE. Certainly; you have all the signs of it. Stay a little while. Oh! how well I see between your two eyes a sign of long life!

HARPAGON. Do you understand such matters?

FROSINE. Of course. Show me your hand. Oh, dear! what a line of life!

HARPAGON. What?

FROSINE. Do you not see how far that line goes?

HARPAGON. Well, what does that mean.

FROSINE. Upon my word, I said one hundred; but you will be more than one hundred and twenty.

HARPAGON. Is it possible?

FROSINE. It will be necessary to kill you, I tell you; and you will bury both your children, and your children's children.

HARPAGON. So much the better. How is our business getting on?

FROSINE. How can you ask? and did anyone ever see me undertake anything in which I did not succeed? I have, especially for marriages, a wonderful talent. There are no matches in the world which I do not succeed in making in a short time; and I believe, were I to take it into my head, that I would marry the Sultan to the Republic of Venice. There were not, doubtless, such great difficulties in this business. As I frequent their house, I have spoken most favourably of you to both of them; and I told the mother the project you had formed for Mariane when you saw her in the street and breathe the fresh air at her window.

HARPAGON. And she answered . .

FROSINE. She received the offer with joy; and when I informed her that you were most anxious that her daughter should be present this evening at the projected marriage contract of yours, she consented without difficulty, and has entrusted her to me for that purpose.

HARPAGON. The fact is, Frosine, that I am compelled to give a supper to Mr. Anselme; and I shall be very glad that she should partake of the treat.

FROSINE. You are right. She is after dinner to pay a visit to your daughter, after which she intends to go to the fair, in order to come afterwards to supper.

NOTES.

(139) *Six vingts.* Formerly the French used to count by scores; even now they still say *quatre-vingts*, four score, or eighty.

(140) *J'ai commerce chez elles.* An antiquated mode of expression; we now say, for instance, *je suis reçue chez elles.*

(141) *Je lui ai témoigné* is here synonymous with *je lui ai dit*, or *je l'ai informée.*

(142) *C'est que* is here equivalent to *le fait est que.*

(143) *D'où.* We would now say *après quoi*, after which, or *de là*, thence.

HARPAGON. Hé bien ! elles iront ensemble dans mon carrosse, que je leur prêterai.

FROSINE. Voilà justement son affaire.

HARPAGON. Mais, Frosine, as-tu entretenu la mère touchant le bien qu'elle peut donner à sa fille ? Lui as-tu dit qu'il fallait qu'elle s'aidât un peu, qu'elle fît quelque effort, qu'elle se saignât pour une occasion comme celle-ci ? Car encore n'épouse-t-on point une fille sans qu'elle apporte quelque chose.

FROSINE. Comment ? c'est[144] une fille qui vous apporte douze mille livres de rente.

HARPAGON. Douze mille livres de rente !

FROSINE. Oui. Premièrement, elle est nourrie et élevée dans une grande épargne de bouche. C'est une fille accoutumée à vivre de salade, de lait, de fromage et de pommes, et à laquelle, par conséquent, il ne faudra ni table bien servie, ni consommés exquis, ni orges mondés perpétuels, ni les autres délicatesses qu'il faudrait pour une autre femme ; et cela ne va pas à si peu de chose, qu'il ne monte bien, tous les ans, à trois mille francs pour le moins. Outre cela, elle n'est curieuse[145] que d'une propreté fort simple, et n'aime point les superbes habits, ni les riches bijoux, ni les meubles somptueux, où donnent[146] ses pareilles avec tant de chaleur ; et cet article-là vaut plus de quatre mille livres par an. De plus, elle a une aversion horrible pour le jeu, ce qui n'est pas commun aux femmes d'aujourd'hui ; et j'en sais[147] une de nos quartiers, qui a perdu, à trente-et-quarante, vingt mille francs cette année. Mais n'en prenons rien que le quart. Cinq mille francs au jeu par an, et quatre mille francs en habits et bijoux, cela fait neuf mille livres ; et mille écus que nous mettons pour la nourriture : ne voilà-t-il pas par année vos douze mille francs bien comptés ?

HARPAGON. Oui, cela n'est pas mal ; mais ce compte-là n'est rien de réel.

FROSINE. Pardonnez-moi. N'est-ce pas quelque chose de réel que[148] de vous apporter en mariage une grande sobriété, l'héritage d'un grand amour de simplicité de parure, et l'acquisition d'un grand fonds de haine pour le jeu ?

HARPAGON. C'est une raillerie que de vouloir me constituer sa dot de toutes les dépenses qu'elle ne fera point. Je n'irai pas donner quittance de ce que je ne reçois pas ; et il faut bien que je touche[149] quelque chose.

FROSINE. Mon Dieu ! vous toucherez assez ; et elles m'ont parlé d'un certain pays, où elles ont du bien, dont vous serez le maître.

HARPAGON. Il faudra voir cela. Mais, Frosine, il y a encore une chose qui m'inquiète. La fille est jeune, comme tu vois ; et les jeunes gens,

HARPAGON. Well ! they will go together in my carriage, which I shall lend them.

FROSINE. That will just suit her.

HARPAGON. But, Frosine, did you speak to the mother as to the fortune she may give her daughter ? Did you tell her that it was necessary she should make a little effort, that she should bleed herself (make some sacrifice) on an occasion like this ? For after all one does not marry a girl without her bringing something.

FROSINE. Why ! she is a girl who brings you four hundred and eighty pounds a year.

HARPAGON. Four hundred and eighty pounds a year !

FROSINE. Yes. Firstly, she has been fed and brought up most economically. She is a girl accustomed to live on salad, milk, cheese, and apples, and who, consequently, will require neither costly meals, nor exquisite soups, nor continual peeled barley, nor the other delicacies which another woman would require ; and that does not amount to so little, but that it costs at least one hundred and twenty pounds. Besides that, she only cares for a very simple neatness in dress, and does not like the sumptuous dresses, nor the costly jewels, nor the splendid furniture in which other women indulge to their hearts' content ; and that article is worth more than one hundred and sixty pounds a year. Moreover, she has a great aversion for gambling, which is not uncommon among the women of the present day ; and I know one in our part of the town who lost at trente and quarante eight hundred pounds this year. But let us take only a quarter of that. Two hundred pounds a year for gambling, and one hundred and sixty for clothes and jewellery : that makes three hundred and sixty pounds; and one hundred and twenty pounds which we reckon for food; have you not there exactly your four hundred and eighty pounds a year ?

HARPAGON. Yes, that is not bad ; but there is nothing real in that account.

FROSINE. Pardon me. Is it not something real to bring you in marriage a great sobriety, the inheritance of a strong liking for simplicity in dress, and the acquisition of a thorough hatred for gambling ?

HARPAGON. You are jesting when you wish to make her dowry consist of the expenses she will not incur. I shall not give a receipt for what I do not receive ; and it is absolutely necessary that I should receive something.

FROSINE. Dear me ! You will receive enough ; and they spoke to me of a certain country where they have some property, of which you will be the owner.

HARPAGON. I shall see to that. But, Frosine, there is still one thing that makes me uneasy. The daughter is young, as you see ; and young people,

(144) *C'est une fille.* In all sentences of this kind the French use the demonstrative pronoun *ce*, and never the personal pronouns.

(145) *Curieuse* is now obsolete in this sense, except perhaps in high style.

(146) *Donner dans*, to spend money lavishly in.

(147) *J'en sais* should be *j'en connais.* Indeed, *connaître* is used in reference to knowledge acquired through the senses without any mental effort, whereas *savoir* invariably implies such efforts.

(148) This idiomatic *que* is intended to lay great stress on what follows.

(149) *Toucher*, literally, 'to touch'; but in reference to money or other negotiable things, 'to receive.'

d'ordinaire, n'aiment que leurs semblables, ne cherchent que leur compagnie. J'ai peur qu'un homme de mon âge ne soit pas de son goût, et que cela ne vienne à produire chez moi certains petits désordres qui ne m'accommoderaient pas.

FROSINE. Ah ! que vous la connaissez mal ! C'est encore une particularité que j'avais à vous dire. Elle a une aversion épouvantable pour tous les jeunes gens, et n'a de l'amour que pour les vieillards.

HARPAGON. Elle ?

FROSINE. Oui, elle. Je voudrais que vous l'eussiez entendue parler là-dessus. Elle ne peut souffrir du tout la vue d'un jeune homme ; mais elle n'est point [150] plus ravie, dit-elle, que lorsqu'elle peut voir un beau vieillard avec une barbe majestueuse. Les plus vieux sont pour elle les plus charmans, et je vous avertis de n'aller pas vous faire plus jeune que vous [151] êtes. Elle veut tout au moins qu'on soit sexagénaire ; et il n'y a pas quatre mois encore qu'étant prête d'être mariée, elle rompit tout net le mariage, sur ce que son amant fit voir qu'il n'avait que cinquante-six ans, et qu'il ne prit point de lunettes pour signer le contrat.

HARPAGON. Sur cela seulement ?

FROSINE. Oui. Elle dit que ce n'est pas contentement pour elle que cinquante-six ans ; et surtout, elle est pour les nez qui portent des lunettes.

HARPAGON. Certes, tu me dis là une chose toute nouvelle.

FROSINE. Cela va plus loin qu'on ne vous peut dire. On lui voit dans sa chambre quelques tableaux et quelques estampes ; mais que pensez-vous que ce soit ? Des Adonis ? des Céphales ? des Pâris ? et des Apollons ? Non. De beaux portraits de Saturne, du roi Priam, du vieux Nestor, et du bon père Anchise sur les épaules de son fils.

HARPAGON. Cela est admirable ! Voilà ce que je n'aurais jamais pensé ; et je suis bien aise d'apprendre [152] qu'elle est de cette humeur. En effet, si j'avais été femme, je n'aurais point aimé les jeunes hommes.

FROSINE. Je le crois bien. Voilà de belles drogues que des jeunes gens, pour les aimer ! Ce sont de beaux morveux, de beaux godelureaux, pour donner envie de leur peau ! et je voudrais bien savoir quel ragoût [153] il y a à eux ?

HARPAGON. Pour moi, je n'y en comprends point ; et je ne sais pas comment il y a des femmes qui les aiment tant.

FROSINE. Il faut être folle fieffée. Trouver la jeunesse aimable ! Est-ce avoir le sens commun ? Sont-ce des hommes que de jeunes blondins ? et peut-on s'attacher à ces animaux-là ?

HARPAGON. C'est ce que je dis tous les jours ; avec leur ton de poule laitée, leurs trois petits brins de barbe relevés en barbe de chat, [154] leurs perruques d'étoupes, leurs hauts-de-chausses tombans, et leurs estomacs débraillés.

FROSINE. Hé ! cela est bien bâti, auprès d'une personne comme vous ! Voilà un homme, cela. Il y a là de quoi generally, only love the like of themselves, only seek their company. I am afraid lest a man of my age should not be to her taste, and that that should lead in my house to certain small disorders which would not suit me.

FROSINE. How imperfectly you know her ! This is another peculiarity I had to tell you. She has a frightful aversion for all young men, and no love but for old men.

HARPAGON. She ?

FROSINE. Yes, she. I wish you had heard her speak on that subject. She cannot at all bear the sight of a young man ; but she is never more delighted, she says, than when she can see a fine old man with a majestic beard. The oldest please her most, and I warn you not to make yourself younger than you are. She will have at least a sexagenarian ; and it is not yet four months since, being on the eve of her marriage, she abruptly broke it off, because her lover showed that he was only fifty-six, and did not use glasses (spectacles) to sign the contract.

HARPAGON. For that reason only ?

FROSINE. Yes. She said that fifty-six years did not satisfy her ; and especially, she likes noses that wear spectacles.

HARPAGON. Assuredly, you tell me there something quite new.

FROSINE. It goes further than I can tell you. One can see in her room a few oil paintings and a few prints ; but what do you think they are ? Adonises, Cephaluses, Pârises, and Apollos ? No, beautiful portraits of Saturn, of King Priam, of old Nestor, and of the kind father Anchises on the shoulders of his son.

HARPAGON. That is wonderful ! That is what I never should have thought ; and I am very glad to hear that she has that turn of mind. Indeed, if I had been a woman I should not have loved young men.

FROSINE. I should think so. Young men are nice drugs for girls to love. They are fine fellows, fine coxcombs, to give one a desire to feel their skin ! and I should very much like to know what pleasure there is in them.

HARPAGON. As for me, I do not see any ; and I do not know how there can be women who love them so much.

FROSINE. One must be an arrant fool. To think youth amiable ! Is it to have common sense ? Are young gallants men ? And can one fall in love with those animals ?

HARPAGON. It is what I say every day ; with their milk-sop like tone, their scanty beard raised like a cat's, their tow wigs, their hose overhanging, and their doublets in a state of disorder.

FROSINE. Ah ! they are well-built in comparison with a person like you ! *You* are a man. There is in you the

(150) *Point plus.* We would now say *jamais si.*

(151) *Vous êtes.* According to the French Academy, we should now say *vous ne l'êtes.*

(152) *Apprendre*, literally, 'to learn.'

(153) *Ragoût* may here be rendered by 'delight.'

(154) *Leur ton de poule laitée, leurs trois petits brins de barbe relevés en barbe de chat.* A nearer approximation to the above words would perhaps be, 'with their effeminate voices, their three little bits of a beard turned up like a cat's whiskers.'

satisfaire à la vue ; et c'est ainsi qu'il faut être fait et vêtu, pour donner de l'amour.

HARPAGON. Tu me trouves bien ?

FROSINE. Comment ? vous êtes à ravir, et votre figure est à peindre. Tournez-vous un peu, s'il vous plaît. Il ne se peut pas mieux. Que je vous voie marcher. Voilà un corps taillé, libre, et dégagé comme il faut, et qui ne marque aucune incommodité.

HARPAGON. Je n'en ai pas de grandes, Dieu merci. Il n'y a que ma fluxion qui me prend de temps en temps.

FROSINE. Cela n'est rien. Votre fluxion ne vous sied [155] point mal, et vous avez grâce à tousser.

HARPAGON. Dis-moi un peu : Mariane ne m'a-t-elle point encore vu ? n'a-t-elle point pris garde à moi en passant ?

FROSINE. Non. Mais nous nous sommes fort entretenues de vous. Je lui ai fait un portrait de votre personne ; et je n'ai pas manqué de lui vanter votre mérite, et l'avantage que ce lui serait d'avoir un mari comme vous.

wherewith to please the eye ; and it is thus one should be built and clothed, in order to inspire love.

HARPAGON. Do you think me good-looking ?

FROSINE. Why, you are splendid, and your face is a model for a painter. Please turn round. One cannot look better. Let me see you walk. That is a body cut, free, and easy as it should be, and which shows no infirmity.

HARPAGON. I have none of any importance, thank God. There is only my cough, which troubles me from time to time.

FROSINE. That is nothing. Your cough is not unbecoming in you, and you look graceful when you cough.

HARPAGON. Pray tell me : has Mariane not seen me yet ? has she not noticed me as she passed ?

FROSINE. No ; but we have had a long chat about you. I described your person to her ; and I did not fail to tell her your merit, and the advantage she would derive from the possession of a husband like you.

(*To be continued.*)

(155) *Sied*, from *seoir*.

NEW COMPOSITION STORIES.—STANDARD V.

Suitable for 'Unseen Tests' in Reading also.

90.

A CLEVER DOG.—Lion is a big black dog, whose master sends him to the post office for his letters. When the clerk sees his shaggy head at the window, he puts the letters and papers into Lion's mouth, when away he trots, never losing any. One day, when coming from the office, he saw a piece of cake on the pavement. Now, Lion is very fond of cake, and he was hungry ; but if he put the letters down, someone might run off with them, for it was a busy street. The shaggy head was still for a minute, as if thinking, and then, dropping the letters carefully, he placed one big black paw on them, and ate the cake as if he enjoyed it.

91.

A STORY OF MILTON.—James II. made a visit to Milton out of curiosity. In the course of conversation the King said to the poet that he thought his blindness was a judgment upon him because he had written against Charles I., the King's father. Milton replied : 'If your Highness thinks that misfortunes are indexes of the wrath of Heaven, what must you think of your father's tragic end ? I have only lost my eyes. He lost his head.'

92.

A SAGACIOUS DOG.—As a gentleman went to the train one morning, he saw a brown retriever dog coming full speed with a letter in his mouth. He went straight to the letter-box. The postman had just cleared the box, and was about twenty or thirty yards off when the dog arrived. Seeing him, the sagacious animal went after him, and had the letter transferred to the bag. He then walked home quietly.

93.

PRESENCE OF MIND.—A clerk at one of the banks was confronted with a man who presented a cheque for one million in gold, at the same time displaying a revolver he had in his possession. The clerk took in the situation at once, saying to the man, 'You will not be able to carry it ; suppose you fetch a horse and a cart while I am counting it out.' The man left, promising to return ; in the meantime arrangements were made to secure him. He had lost his reason, and had but a small balance standing to his account at the bank.

94.

THE HUNTER AND THE BEAR.—A Siberian hunter lost his way in a snowstorm, and fell into one of the deep pits dug as traps to catch wild animals. He was badly hurt, but groped about and found his gun and bag. Then he lit a cigar, hoping that some other hunter would come in the morning to examine the trap, when he would be helped out. Very soon there was a terrible crash, and the man knew that a bear had fallen into the pit. He could see its glistening eyes coming nearer, so he struck a match. The fierce beast rose on its hind legs, and was killed by a shot from the hunter's gun. In the morning the man's companions found him, and brought him up out of the pit, along with the bear's dead body.

95.

THE PARROT WAS RIGHT.—A gentleman went into a bird shop the other day to purchase a parrot. On seeing one he fancied, he asked the price. 'Twenty pounds,' said the dealer. The gentleman looked at the bird, and said: 'Poll, are you worth twenty pounds?' 'There's no doubt about it,' screamed the parrot. This seemingly intelligent reply so pleased the gentleman that he bought it. After arriving home he found, much to his disgust, that the parrot could only say the few words he had heard in the dealer's shop. 'How foolish I was,' he exclaimed, 'to give twenty pounds for that parrot!' 'There's no doubt about it,' screamed Poll. This time the parrot was right.

96.

A FISH-EATING COW.—Here is an amusing instance of a cow's fondness for fish. A gentleman caught a salmon, and having hidden it with the greatest care among some rushes, proceeded to fish down the river, intending to pick it up on his return in the evening. What was his disgust when he found an old cow making a meal of his precious capture, little but the head being left! In his exasperation he seized a trout which chanced to be in the basket, and hurled it violently at the head of the unconscious animal, striking her full in the face; but the old cow, not the least disconcerted, quietly picked up the trout and swallowed that also.

97.

A COURAGEOUS WIFE.—A famous Dutchman was sentenced to imprisonment for life. He was, however, permitted to have his books, and his wife was allowed to visit him. Every week a large chest, containing linen, books, &c., was allowed to pass in and out of the prison. The guards, of course, carefully examined the contents, but, as they never found anything wrong, they at last ceased to search the box at all. The loving wife, observing this, got her husband to place himself in the chest. So air holes were made, and the guards, of course without knowing it, carried their prisoner to his friends. When they found out that the wife had played this trick upon them, and that they had themselves assisted in their prisoner's escape, they were very angry, although they could not help feeling that she had proved herself to be a loving and courageous wife.

98.

THE SERVANT AND THE QUEEN.—A good story told of a servant is that having once borrowed 500*l.* of the Queen, and not being able to return it, contrived to find out the time when Her Majesty went out on a particular day, she being obliged to pass his house. He had a coffin made, and having let his family into the secret, he invited his friends to his funeral, and lay down in the coffin. It was so arranged that the coffin should be carried out just as the Queen came by. She naturally inquired who was dead. The undertaker replied, 'It is your late servant.' 'What!' she exclaimed, 'is he dead? The poor man owed me 500*l.*, but I forgive him the debt with all my heart.' The servant instantly rose up in his coffin and cried out, 'I thank Her Majesty. The favour she bestows upon me is so agreeable that it has brought me to life again.'

99.

REVENGEFUL RATS.—The other day a gentleman, looking over a wall, saw a dead hen in the field. Presently a rat ran up, sniffed at the dead fowl with much satisfaction, and went away in some haste. The gentleman knew what that meant, and removed the hen from the spot. In a minute or two the rat came back with half-a-dozen friends, with the evident intention of removing the carcase for future use. Arrived at the spot where the fowl had lain, the rat raised a loud squeak of astonishment at its absence. In a trice the other rats fell upon him so savagely that they left him dead on the field as a warning not to play practical jokes with his friends.

100.

INTELLIGENCE OF A COLLIE.—A gentleman once saw a collie, in the Highlands of Scotland, left in solitary charge of a flock of sheep which were feeding in a field separated only by a ruined wall, full of wide gaps, from a field of young corn. He watched the dog, which had taken his stand on a hillock, from whence he could overlook the whole field, and check the slightest attempt to make free on the part of the sheep. The person who accompanied the gentleman, told him that the dog remained patiently and watchfully at his post from the earliest dawn until nightfall, and brought the flock home in the evening on hearing the shrill whistle of his master, who lived nearly a mile away. What extraordinary intelligence, and what a strict sense of duty, must this dog have possessed!

101.

THE MYSTERIOUS LEGACY.—There has just died, at the ripe old age of ninety, a lady of great wealth and uncommon sagacity. Her will, which was opened on the day of her death, contained the following clause: 'I bequeath to my doctor the entire contents of the old trunk in my dressing room, the key of which will be found in the mattress of my bed.' There was great excitement among the relatives, who imagined the treasures of the deceased to be escaping out of their clutches. At last the doctor was sent for, the trunk was opened and found to contain intact and uncorked, all the drugs and mixtures that he had prescribed for her during the last thirty years.

102.

No Need to Hurry.—Two friends were driving along a narrow country lane, when the horse took fright at a stone heap, and bolted. The driver was calm, but his companion exhibited every symptom of fear, and exclaimed: 'I'd give five pounds to be out of this.' 'Keep your money in your pocket,' replied his friend, 'you'll be out in a minute or so, and it won't cost you anything.' He had scarcely got the words out of his mouth when the carriage was overturned and they both rolled into the ditch.

103.

Jerry Didn't See It.—A gentleman had a servant called Jerry, a handy man, who was of invaluable service to him—until poor Jerry took to drink. His master, as much in his own interests as in Jerry's, was continually trying to reform him; and to this end he would read to him every story of crime or of trouble traceable to drink which he could find. At last he came upon a thrilling tale of a drunkard who was so saturated with whisky that his breath caught fire as he was blowing out a candle, set his inside ablaze as it would have set any other whisky cask, and burned him to ashes in five minutes. 'Now, Jerry—now, Jerry,' urged the master, with great solemnity, 'let this be a warning to you!' 'Oh, it will, so, sir!' groaned the horrified Jerry. 'I'll never blow a candle out again the longest day I live!'

104.

The Woman and Her Hen.—A woman who lived in the country, had a hen which laid her an egg every day. Presently she said to herself, 'I wish that hen of mine would lay two eggs a day instead of one.' So she gave it a double feed of barley daily, expecting it would lay twice as many eggs. But the hen only grew very fat, and stopped laying altogether.

NEW READING TESTS.—Standard III.

Suitable for 'Unseen Tests' in Dictation also.

80. It is impossible to deny that the monkey is the funniest of all animals. Half an hour spent in the monkey-house of any zoological garden will yield plenty of proof in support of this statement. But the gift of speech places the parrot in one respect ahead even of the monkey. In fact, some parrot stories are so comical that it is hard to believe that they are really true.

81. Robert was the dunce of the family. One day his father suddenly said, 'Who's up top in your form now, Robert?' 'I am, father,' briskly responded the boy. 'Well, come, that's better; and who's at the bottom?' More slowly the answer came, 'I am, father.' 'Well, but how many boys are in your form then?' Robert's head bent over his plate as he murmured, 'Only one.'

82. The baby sat on the grass, and talked, though no one understood what she was talking about. Anne read her story, and the other three gathered flowers or ran after butterflies, coming back every few minutes to ask Anne if it wasn't time for dinner. Then, when the sun was very high, they were all too hungry to wait any longer, and the basket was soon emptied of its contents.—H.M.I's Test.

83. Slow, steady, sure—these three words fitly describe the camel's pace. This may surprise those who look at the animal's lanky legs and compact barrel-shaped body, but what the creature lacks in speed it makes up for in powers of endurance. At a pinch, the camel will do its seven miles an hour, but it will not keep up this rate for more than a couple of hours.

84. When men, boys, and girls too, first begin to do a thing, they do it clumsily, and afterwards they improve with practice. But the insects do things perfectly from the beginning. The baby spiders, soon after they are born, will set to work and make a web, and do it as skilfully and cleverly as their mothers, without having received a lesson from them.

85. Drinking cups and bottles were long ago made of leather, and the former, which were usually called 'Jacks,' were sometimes mounted in silver. It is stated that certain Frenchmen, after seeing these drinking vessels, reported, on returning to France, that Englishmen used to drink out of their boots.

86.— 'Thou must be true thyself
If thou the truth would teach;
Thy soul must overflow if thou
Another's soul would reach;
It needs the overflow of heart
To give the lips full speech.'

NEW DICTATION TESTS.—Standard IV.

Suitable for 'Unseen Tests' in Reading also.

16.

The green tree-frogs are often used in Germany as barometers; they are placed in tall bottles with little wooden ladders. The steps of the ladder mark as it were the degrees; the frogs always go up towards the top in fine weather, and lower down at the approach of bad weather. Germans often consult their frogs when starting on a pic-nic expedition.

17.

Of all royal personages the Prince of Wales is the most noted for the enormous quantity of luggage which he causes to be sent with him on his journey. He takes whole boxes of hats, and huge trunks of dress suits, morning coats, and other changes. He makes a point when visiting anywhere of not being seen twice in the same coat, and the variety of his garments is as astonishing as the tailor's bill for them must be long.

18.

There is a story of two knights who fell into a quarrel about a shield. One asserted that it was made of gold; the other, that it was silver. Now, neither was right, yet each was correct as to that part of the shield which he saw. Looking at it from different points of view, not having the same standpoint, they quarrelled; and the quarrel was a mistake. The two knights saw one and the same shield; but, looking on it from opposite sides, each saw a different face—this was of silver, that of gold.

19.

It is a commendable ambition which animates, or ought to animate, everyone to do something to make the world better, and for which he will be gratefully remembered by succeeding generations. If anything of this sort is to be accomplished, we must get about it at once. It is not necessary that we should live long in order to do a work that will be a blessing to the world; but it is necessary that we should be earnest, active, diligent workers in our day.

20.

The most popular of the Queen's daughters is said to be the Princess Christian, who is described as good-looking, with a pale face, dark grey eyes, and a dignified carriage. There has been much rejoicing since her return from Germany on the almost complete restoration of her eyesight, which was previously the cause of much anxiety. She has a charming smile, and her voice is very sweet. In this respect the Princess Louise is not so fortunate, her accident in Canada having left a huskiness which has impaired its clearness, and affected the ring of her laugh.

21.

Too much cannot be said in regard to the education given to the daughters of the Princess of Wales. They know how to sew so well that they can make their own gowns, and their knowledge of every art taught them is thorough. They can go into the kitchen and cook—cook well; they understand the art of bread-making, and if they were ever thrown upon their own resources would be able to take care of themselves.

22.

The Greenlanders consider the sun and moon as brother and sister respectively, the former being constantly pursued by the latter. During an eclipse they consider that the moon has gone behind the houses to pilfer their skins and eatables. On such occasions the people hide everything they possess, and the men carry chests and kettles on to the tops of the houses, and beat them to frighten away the moon. During an eclipse of the sun the people pinch the ears of their dogs until they cry, and this is the sign that the end of the world is not yet come.

23.

The keenest sorrows of the world are in the homes of people of affluence, who are so much envied by those who struggle in daily toil for bread; but if the skeletons of the homes of the honest sons of labour could be compared with the skeletons of the homes of the rich, both would learn that there is no happiness in idleness, no wealth but the content of industry.

24.

The electric light has been employed for a novel purpose. The gamekeepers on an estate found that poachers were in the preserves, and by the aid of occasional flashes from the powerful search-lights at Hurst Castle, though several miles distant, they were able to recognize two men who ran away, leaving behind them a net a hundred yards long. They were subsequently arrested, and paid the penalty, personally cursing the progress of science.

25.

The Dead Sea is eight times salter than the ocean, and has, consequently, so great a density that the human body will not sink in it. It is a mistake to suppose that there is absolutely no sign of life in the neighbourhood of this sea, for birds are found in its vicinity and even upon its waters. There is no more desolate spot upon the face of the earth than this sheet of water and its surroundings.

26.

Less than three hundred years ago porcelain was hardly known in Europe, and was worth its weight in gold. Wooden dishes were for every day, with perhaps a silver dish for Sunday for those who could afford it. The first pots and plates were brick-red. A white dish cost years and years of search, trial, and experiment. The first pieces of porcelain were from China, early in the fifteenth century, and attracted great attention.

27.

How sweet and gracious, even in common speech,
Is that fine sense which men call courtesy!
Wholesome as air and genial as the light,
Welcome in every clime as breath of flowers,
It transmutes aliens into trusting friends,
And gives its owner passport round the globe.

STANDARDS V.–VII.

8.

Tea-tasting is a remunerative business, and it should be, for experts devote their lives to the cultivation of taste and smell. In order to do this they deny themselves many luxuries. But few of them smoke, as that habit has a tendency to blunt their sense of taste. The same is true of wine and liquor drinking, and those who do permit themselves at times to indulge in a cigar or a glass of wine take only the very best to be obtained, and then limit themselves to very small quantities. They are also careful about the seasoning of their food; too much pepper has a tendency to blunt the sense of taste, and the tea-taster who wishes to make himself successful in his business has his food less highly flavoured.

9.

The tools put by science into the hands of earnest workers are not the exclusive property of honest men. The clever rogue is quite ready to turn them to use in some of his little games. He is declared, on good authority, to make an ingenious use of electricity in the operation known as 'sweating' gold coins. The plating process is his mode of working, an ordinary battery and some cheap acid being the tools. The gold removed from the gold coin is deposited as plating on a piece of other metal, and as it is used uniformly from all parts of the coin the disfigurement is not noticed, the only effect being to blur the characters slightly.

10.

Fourteen thousand emigrants who left Russia in consequence of the famine, have arrived in a most miserable condition. Having exhausted all their resources on the journey, they are now in want both of food and clothing. They are, moreover, suffering from diseases of all kinds, and their condition is hopeless, as their want of means prevents them from either continuing their journey, or returning to their homes. Many have already died, either from disease, or the frightful privations they have undergone.

11.

There is an excellent institution in some cities of the United States in connection with the Women's Christian Association, and entitled, The Women's Training School. It aids deserving girls and women to obtain a living by training them to proficiency in various employments. Economy being a necessity, the ladies who started the school have themselves undertaken the whole of the teaching. One, whose reputation as an excellent cook was well known to her friends, became head of the cooking class, helped by others who acted as amateur kitchenmaids until some of the pupils became sufficiently advanced to perform these necessary offices.

12.

No nation can possibly be in a healthy, a safe, or a really prosperous condition, in which the balance is upset to the disadvantage of agriculture. How far the promised experiments in creating a class of small yeomen will succeed, it is premature to say with confidence. But we need not hesitate to declare that it is of the utmost importance to the realm that a stimulus of some kind should be given to the industry of agriculture. The Islington Show affords ample evidence of the immense amount, not only of capital, but also of intelligence and labour, that is invested in it.

13.

Neuralgia, consumption, and scrofula, are very prevalent in the gloving districts. This may be partly attributed to the perpetual bending of the women over their work, but is due in a larger measure to bad food, bad drainage, and insufficient ventilation. People are beginning to see at last that the beautiful does not always go hand in hand with the healthful. Some of the two or three roomed cottage homes in the west country, despite their flowers and snowy curtains and shining casements, are perfect death traps to those who inhabit them.

14.

A young Parisian artist lately painted a portrait of a duchess, which did not satisfy her friends, who declared it was totally unlike her. The painter was convinced, however, that he had succeeded, and proposed that a little dog belonging to the duchess should be brought, to prove the resemblance. The dog was brought before witnesses, and no sooner did he see the picture than he sprang upon it, licked it all over, expressing great joy. The painter's triumph was complete. He had retouched the picture during the night with a thin coating of lard. The dog's nose was sharper than the critics' eyes.

15.

Recently a fire broke out in a workshop. The proprietor ordered the use of steam in addition to other appliances for subduing the fire. The stop valve having been opened, the steam escaped under high pressure, filling the workshop and suffocating the fire. At first the steam, being condensed, saturated with moisture all the combustible objects in the room. More steam being added, the fire was completely extinguished. The smouldering bales of cotton could then easily be washed out with water. Upon close examination it turned out that much less damage had been done to the building, the machinery, and the goods than if water had been used for extinguishing the fire.

16.

There is one little piece of kindness which almost all, old and young, have opportunities to perform, and by the practice of which they can very materially add to the comfort and happiness of less fortunate persons. It is to avoid looking at deformities or marks of disease when they are met in the street or the home. The keen suffering given to a sensitive person—and all persons with a noticeable deformity may well be supposed to be sensitive on that subject—is such as one who has felt it can alone understand to the full. Of course it is the most natural thing for the eye to fall upon that which is marked or unusual; but that is a poor excuse for unkindness.

17.

God fulfils himself in many ways.
More things are wrought by prayer
Than this world dreams of. Wherefore, let thy voice
Rise like a fountain, for ever, night and day;
For what are men better than sheep or goats,
That nourish a blind life within the brain,
If, knowing God, they lift not hands of prayer
Both for themselves and those that call them friend?
For so the whole round world is every way
Bound by gold chains about the feet of God.

SCIENCE AND ART DIRECTORY.

(*Revised to June* 1893.)

By the courtesy of the Department we have received a copy of the above manual.

The alterations from last year are not many in number or signal in importance.

The chief of these may be summarised as follows:—

Art. XIII.—Grants for fittings, apparatus and examples are suspended, except in Ireland, whilst the Local Taxation (Customs and Excise) Act, 1890, continues in force.

Art. XXIV.—No persons *who have relatives to be examined within their districts* can act as Special Secretaries.

Art. XLII.—Tickets of admission to the various museums are now given to handicraftsmen and persons engaged in trades which depend on decorative art.

Art. XLIX.—Specimens of students' works for the advanced stages will be lent to schools of art for a fortnight.

Science Art. 6.—Under certain circumstances, but only for sufficient reason, the Department may sanction in science day schools attendances of 45 minutes' duration where 40 lessons have been given, and each pupil for whom grant is claimed has attended 30 lessons.

Such lessons may be registered in three subjects in one day.

Science Art. 7.—In the elementary stage the candidates are recorded simply as having passed or failed.

For a pass in the elementary stage the standard of attainment required is about 60 per cent.

The Department may require from the local committee a payment of 2s. 6d. for every paper of answers which the examiner reports as obtaining less than 25 per cent. of the marks. A local committee may call upon the candidate to deposit this 2s. 6d.

Science Art. 8.—The times of examinations shall be published later on.

Science Art. 37.—University College of North Wales, Bangor, is added to the list of colleges whither 'aided' teachers may betake themselves.

Part II. Art. 39.—When scholars are received from another evening school the managers must ascertain in what standard they were last examined.

Part III. Art. 5.—The Elementary Drawing Certificate (First Class) will be granted to candidates who obtain a First Class in the elementary stage of—

(*a*) Freehand drawing (Subject 2*b*);
(*b*) Model drawing (Subject 3*a*);
(*c*) Shading from casts (Subject 5*b*); and
(*d*) A pass in the elementary stage of practical, plane, and solid geometry (Science Subject I.).

See also Certificate Article, Section V.

OUR 1893 CERTIFICATE CLASS.

BY DR. GEORGE BEACH, M.A.,

Co-Author of a 'Manual of our Mother Tongue,' 'A Girls' Arithmetic,' Author of 'Elements of English,' 'Entertaining Readers,' 'Historical Readers,' etc.

ENGLISH HISTORY. FEMALE CANDIDATES—SECOND YEAR.

Wednesday, 14th December, 3 to 6.

Candidates are permitted to answer Eight questions only.

If you answer more than Eight questions, only the Eight answers coming first on your paper will be revised.

I. MODEL ANSWERS.

1. What grievances had the working classes in England which led them to sympathize with the French Revolution?

The great grievance of the English working-classes at the outbreak of the French Revolution was the want of an increased and more direct representation in the House of Commons. Towns, the wealth and population of which had rapidly increased during the latter part of the 18th century were unrepresented, whilst decayed and rotten boroughs still sent their owner's nominee to Parliament.

Again, the war with France and Spain just concluded had added £100,000,000 to the National Debt, and the country had been almost drained of fighting men. It would have been difficult at this period to find 5,000 men for any foreign expedition.

But apart from these, the working-classes had little about which to complain. The Revolution of 1688 had secured freedom of conscience and the People's Right to govern themselves. Class Privileges were few and of little moment. Not so in France. There, the clergy and nobility possessed many unjust privileges, amongst others complete immunity from taxation, whilst the tiller of the ground was glad if he could secure a tithe of the produce he raised. The French Revolution was at first viewed with satisfaction in England, because it was regarded as the righteous attempt of an oppressed people to overthrow a government which was radically bad.

2. What opinions regarding the Revolution were held by Fox and Pitt respectively?

Fox was an ardent admirer of the Revolution and repeatedly praised it in extravagant language. When he heard of the fall of the Bastille he exclaimed 'How much is this the greatest event that ever happened in the world, and how much the best.' His feelings on this matter led to an estrangement with Burke, and split up the Whig party. Afterwards, when from the anarchy there sprang no stable government, he remarked that at all events the arbitrary system was done away with, and the new system had the good of the people for its object.

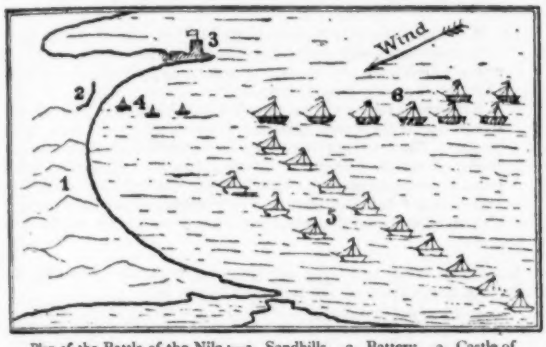
Pitt was not sorry to see the French Court overthrown, but he was most anxious to keep aloof from French politics. In 1790 he considered 'the present convulsions in France must sooner or later culminate in harmony and regular order.' But when the agitation reached England and Republican Societies sprang up, he was led to interfere with the doings and sayings of the people.

His opinions, never so ardent as those of Fox, gradually veered round, and, as far as his cool nature would allow, coincided with Burke's. But his energies were wholly engrossed with the effort to steer England clear of the revolutionary feeling. His aim was strict neutrality.

3. State the special importance of any two of the naval victories of Cape St. Vincent, Camperdown, the Nile, and Copenhagen. Draw a plan of the Battle of the Nile.

The Battle of the Nile (1798) ended with the annihilation of the French Fleet. Napoleon's Grand Army was imprisoned amid the sands of Egypt. At Acre he met with his first reverse on land. His troops being in a dilemma, out of which even his genius could not extricate them, he deliberately deserted them, and they were finally routed by Sir Ralph Abercromby. Thus the Battle of the Nile

(*a*) Saw the destruction of the French Navy,
(*b*) Proved that Napoleon's forces were not invincible,
(*c*) Brought about the victory at Alexandria.



Plan of the Battle of the Nile :—1. Sandhills. 2. Battery. 3. Castle of Aboukir. 4. Gunboats. 5. French Fleet. 6. English Fleet.

The victory at Copenhagen ended in the defeat of the Danes. Her ships were compelled to strike their flags, and thus Napoleon was baffled in his designs on the Danish Fleet. An accident still further strengthened the effects of this blow. Just at this time Paul, the crazy Czar, was assassinated. His successor changed the Russian policy, and the Northern League, which had appeared so formidable, was no more.

4. What were the conditions of the Act of Union with Ireland? What were the circumstances in connection with it which led to the resignation of Pitt?

(1) A United Kingdom of Great Britain and Ireland with one Parliament at Westminster.

(2) Ireland to be represented by 4 spiritual peers, 28 temporal peers, and 100 commoners.

(3) The established Churches of England and Ireland to be united.

(4) Both countries to enjoy the same commercial privileges.

(5) The laws and courts of each country to remain the same as before, subject to alterations by the united parliament.

Pitt wished to render the bill still more perfect by the addition of a clause for the Relief of Catholics from all disabilities.

This question of Catholic Emancipation was introduced in the first Imperial Parliament of the United Kingdom. It met with bitter opposition, and Pitt resigned.

5. Describe the course of the war with Napoleon immediately preceding Pitt's death.

Pitt's Second Ministry lasted from May 1804 to January 1806. The chief aim of his policy was to form a Grand European Coalition against Napoleon. Russia and Austria joined the scheme and Sweden a little latter. Napoleon's reply was to prepare for the invasion of England. Both schemes failed. The French Admiral Villeneuve received orders to lure Nelson away to the West Indies. He was then to return and sweep the Channel with the aid of Rochefort's squadron. He succeeded in decoying Nelson away, succeeded in eluding him, and got back to Ferrol. Here Napoleon's orders awaited him. They were sufficiently explicit. He was to fight the English fleet blockading Brest, and then to clear the Channel. He fancied his fleet was not powerful enough for the task, and sailed to Cadiz for more ships. He only got out of that port to meet Nelson off Trafalgar, and his fleet was annihilated 1805. Napoleon, disappointed by his non-appearance, abandoned his flotilla, turned his men towards the Rhine, and in three months had defeated the Austrians in Bavaria, surrounded Mack at Ulm, and captured his army of 30,000 men, entered Vienna, followed the Austrians up to their juncture with the Russians, and utterly defeated the combined armies at Austerlitz. The Coalition and Pitt were no more.

6. Say what you can about Pitt (1) as a finance minister, (2) as Prime Minister during a great war.

(1) As a finance minister Pitt was a success. The National Debt amounted to £250,000,000. Taxes had been imposed at haphazard.

He strove to reduce the debt. He borrowed money by public contract, and thus got it at the lowest possible interest. He encouraged honest dealing by publishing the account of money received and paid by Government. He lowered the heavy duties on tea, wine and spirits, and thus created a trade which had hitherto been in the hands of smugglers. Trade meant revenue. Customs and Excise duties were many and difficult to calculate. Pitt fixed a single duty on each article which was less vexatious.

He endeavoured to free Ireland from the high protective duties which crushed her trade, but was foiled by Grattan and Curran. He was successful in arranging a commercial treaty with France, which greatly increased the trade between the two countries.

(2) As a war minister Pitt was not a success. Canning calls him 'The heaven-born minister who weathered the storm.' This is untrue, for he died in the midst of it. Pitt's grand mistake was to enter the lists against Napoleon on the Continent. If he had been content with ocean supremacy and adopted the Fabian policy until the spiritless nations of Europe had been flogged into resistance, his money might then have produced some effect. But to form coalitions which melted at Napoleon's approach, to squander millions in providing arms for people to work their own salvation, only to see those arms fall into the Corsican's hands, to be used against us, was a huge mistake.

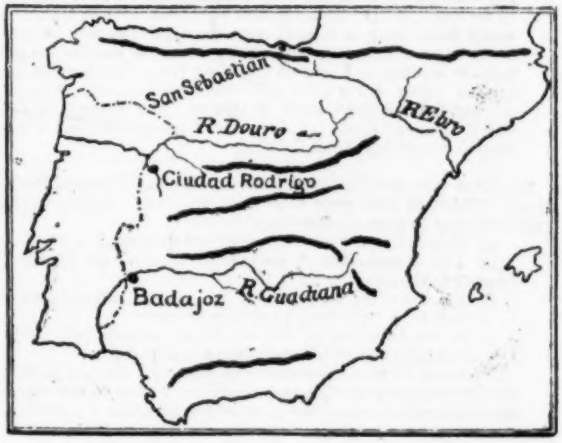
His obstructive policy would stand no chance in these days, and the only monument of its folly is our National Debt. He pledged the property of posterity and then failed.

7. Say what you know of (1) Moore's retreat to Corunna, (2) The Lines of Torres Vedras.

(1) In 1808 the Spaniards made an effort to throw off the the French yoke. It was a wild effort of confused patriotism, and led to no tangible results. England despatched Sir John Moore to their assistance. When he arrived at Salamanca he learned that the Spaniards had been easily routed by Napoleon's veterans. However, buoyed up by false information, he advanced as far as Sahagun. Here he found himself almost within the toils, the French army far outnumbering and almost surrounding his own. He at once retreated, pursued by Soult. Arrived at Corunna he found no fleet to take his troops on board, and an engagement was forced upon him. With an army famished, shoeless, and rag-clad, he gained a brilliant victory, but lost his own life.

(2) The celebrated Lines of Torres Vedras were designed for the defence of Lisbon. Three strong lines of fortified works reaching from the Tagus to the sea were defended by the English and Portuguese armies, whilst an English fleet was in the harbour. The hills were cut into steep escarpments, and forts crowned their summits. Gorges were blocked and cannons commanded every approach. In all there were something like 50 miles of fortification, 150 forts, 1,600 guns. Massena, the 'Child of Fortune,' having received orders to drive the English leopards into the sea, encamped before these lines for a month, and then withdrew with a famished and disheartened army.

8. Draw a plan showing the military importance of the Douro, Badajoz, Ciudad Rodrigo, the Ebro, and San Sebastian. With



what difficulties besides those of actual fighting had Wellington to contend during the Peninsular War?

The Douro, Ciudad Rodrigo, and Badajoz, were important to Wellington as fresh bases of action from which to invade Spain; the Ebro and San Sebastian, to invade France.

During the whole of the Peninsular War, Wellington had the most terrible difficulties to face. His commissariat department was utterly unable to provide for the needs of his army. Provisions were scarce. The French pillaged everywhere. An Englishman was strung up at once by the Provost Marshal if caught obtaining his dinner by questionable means. The Spanish generals were punctilious, jealous, and useless. He (Wellington) might have been distracted by the contrary views of the home ministry if he had been weak and vacillating. But his genius surmounted all these obstacles. Like Hannibal he trained an army fit to go anywhere or do anything.

9. Draw a plan and briefly indicate the different stages of the Battle of Waterloo.

1st stage—The first great movement of the French was directed against la Haye Sainte and the Chateau of Hougumont. The first they succeeded in occupying, but Hougumont was never taken, although defended by a mere handful of men.

2nd stage—The greater part of the day was spent in pounding away at the British squares and hurling vast masses of cavalry against them. Kellerman led one attack of 18,000 swordsmen. But the British squares remained 'rooted to the ground,' to Wellington's delight and Napoleon's perplexity. To its immortal renown it must be remembered that the bulk of the army were not Peninsular veterans, but militia and raw recruits.

3rd stage—Towards the close of the day Blucher's guns were heard, and Napoleon knew that if Wellington held his ground and effected a juncture with the Prussians his own fate was sealed. He now made his supreme effort. The Imperial Guard, 10,000 strong, the élite of his army, were urged against the British army in 2 dense columns, preceded by skirmishers and covered by the fire of 100 guns. As they mounted the slope the guns ceased, and now came the most critical moment of the day. If the English centre had been broken Waterloo would have been a French victory. The English infantry however were formed in skirmishing order on the flank of the massive column and opened a galling fire. The head of the column began to crumble, and Wellington seizing the right moment ordered the Guards to charge. The French did not wait for the cold steel, but fled, and a general advance of the English swept them from the field.

10. What were the chief conditions of the Second Treaty of Paris, 1815? Which of them were afterwards nullified? Why was the Peace followed by great commercial distress?

(1) France was reduced to its limits as they stood in 1790.

(2) The allies retained possession of 17 of the principal frontier fortresses.

(3) 150,000 allied troops were to be quartered and maintained by France for a period not exceeding five years.

(4) A war indemnity of 700,000,000 francs to be paid to the allied sovereigns by easy instalments was imposed.

Numbers 3 and 4 were afterwards altered. The troops were finally withdrawn in 1818, and an additional 700,000,000 francs were demanded from France as indemnification for damage done to private property in Europe.

The exhaustion of the country was great, and the recovery at first was slow. The enormous debt, £880,000,000, pressed hard, and the resulting distress created bitter discontent throughout society. Such industries as had flourished by reason of the war now suffered severely. Large numbers of soldiers and sailors were thrown on the already overwhelmed labour market. The scarcity of labour during the war had led to the invention of new machinery, and this temporarily threw thousands out of work.

The Luddites roamed through the country smashing machinery. Parliament, to please the landowners and farmers, forbade the importation of corn into the country until the price was 80s. per quarter—and this after a bad harvest! There was neither employment nor food.

11. What great industrial inventions had preceded the great war?

James Watt made great improvements in the steam engine, and applied it to machinery. Previous to 1785 water had been the motive power in cotton spinning.

Arkwright invented the spinning machine, and this was followed by Hargreaves' spinning jenny and Crompton's mule-jenny. These inventions created vast possibilities in the cotton trade, of which Lancashire availed itself. Wedgwood made great improvements in the biscuit, form, and printing of earthenware. Cort led the way to the process known as puddling. Crown, plate, and flint glass were introduced between 1760 and 1780.

12. Write notes upon the Blanketeers, Peterloo Massacre, Six Acts, and Suspension of the Habeas Corpus Act.

Blanketeers—A body of weavers 5,000 strong who met at St. Peter's Field, Manchester (1817), demanding reform. Dispersed by soldiers and pursued by yeomanry they had dwindled down to 180 on reaching Macclesfield, and 20 at Leek, whilst on their way to London. Called Blanketeers because they carried blankets, rugs, &c., knapsack fashion, on their backs.

Peterloo Massacre—Reform meeting held in St. Peters' Fields, Manchester, 1819. After the Riot Act had been read, the yeomanry were ordered to charge the crowd, which they did, using the edge as well as the flat side of the blade. Many were killed and wounded. Hence the name, suggested by 'Waterloo.'

Six Acts—A very stringent measure. Parliament's reply to the Trade Riots and Reform meetings of 1819. They were directed against training in arms, possession of arms, holding seditious meetings, publishing seditious libels or pamphlets.

Suspension of the Habeas Corpus Act—The distress prevalent throughout the country after the great war led to frequent disturbances. The Government were either unable or unwilling to find remedies. They attempted to force the people into quietness by such measures as the Six Acts and Suspension of the Habeas Corpus Act. These armed magistrates with the fearful authority to arrest and imprison at pleasure, without bringing the accused to justice.

13. State what you know of the Criminal Code before it was reformed; and of the old Poor Law.

At the beginning of this century the law recognised over 200 different crimes as worthy of capital punishment. A man could be put to death for stealing 5s., shooting rabbits, appearon any public road in disguise, poaching, returning from transportation before the expiration of his time, &c., &c. The severity of the law led to weak execution of the same. Juries could not be found to sentence fellow creatures to its harsh punishments.

The old Poor Law was lamentably weak, fostered laziness, and offered a premium on vagrancy. 'As happy as a beggar' would have been a good simile previous to 1834. The sturdy vagrant refused broken meat. If he entered the workhouse his food was granted to him without stint. Good table beer was allowed. He could save money, and leave legacies. In some districts the poor rate equalled the rent of the land. In the half-century, 1783–1833, the population increased 75 per cent., while the poor rate during the same period increased 300 per cent.

14. Say in what connexion the names of Clarkson, Hone, Priestley, Romilly, Wilberforce, stand to the history of the period?

Clarkson was one of the leaders of the movement which had for its object the abolition of the slave trade. He laboured outside the House of Commons, whilst Wilberforce did all he could within.

Hone, a bookseller in the Old Bailey, and a clever parodist. His parodies on the existing government (1817) annoyed them so much that he was brought to trial. He was charged with constructing parodies upon religious matter, but this deceived nobody. He was brought to trial three separate times, but

defended himself with great ability, and was thrice acquitted. He was now formidable, and assailed the government with a succession of stinging squibs—The Political Showman, etc.

Priestley—Dr. Joseph Priestley, a Unitarian Minister, known and esteemed for his researches in electricity, chemistry, and pneumatics, but better known, historically, for his defence of French Revolutionary principles. Whilst living in Birmingham, he with other kindred spirits resolved to celebrate the first anniversary of the Fall of the Bastille by a dinner. This led to the Birmingham Riots.

Romilly—Sir Samuel Romilly was one of the earliest and most zealous champions of law reform. His life was devoted to the amelioration of the penal laws. He obtained many concessions from government. He died by his own hand, 1818.

Wilberforce—William Wilberforce, member for the county of York, was the champion of the slaves in the House of Commons. Time after time he brought forward his motion to free slaves in British Colonies, only to see it defeated. He was victorious in the end, and lived to see England pay £20,000,000 as compensation to slave-owners.

15. What do you know of Sir A. Wellesley's career before his first commission in Portugal, and of the government of India under his brother, Lord Mornington?

Sir Arthur Wellesley first saw active service in the Netherlands, and covered the retreat of the English army from that country in 1796. He afterwards embarked for India, and, in conjunction with Generals Lake, Harris, and Baird, successfully carried out his brother's policy. In 1803, with an army of 4,500 men, he defeated the Mahrattas at Assaye and Argaum. The 'Sepoy-General' was here training for his Peninsular Campaign.

He studied the welfare of his troops, made the commissariat department a reality, and infused new life in the army.

Lord Mornington was Governor-General of India from 1798 to 1805. He ruled India vigorously, but wisely. From the first he recognised that there could be no real peace until English power was strong enough to forbid native states from tearing one another to pieces. By the aid of his successful generals he broke the power of the Mysore usurpers and the Mahrattas. He was recalled by a government that desired peace and no interference. Years aftewards his policy was better appreciated.

16. Say in what way the French Revolution affected the literary history of the period; mentioning especially the view taken of that event by Wordsworth, Southey, Coleridge, and Burke respectively.

Socialistic ideas had been growing up in Europe for more than a century. The rights of man and the destruction of class and caste, together with openly avowed infidelity, had long been advocated in French literature. When the Bastille fell, and action took the place of thought and suggestion, these doctrines were speedily imbibed in England, and as speedily bore fruit. True, Burke stood against them, but he was practically alone among writers. This truly great man saw with almost prophetic instinct that the Revolution with its fiendish atrocities would not bring freedom and happiness to France, but rather wars and more wars. His 'Reflections on the French Revolution' proved an arsenal from which all men averse to the movement chose their weapons. This work called forth many attacks, the chief of which was Thomas Paine's 'Rights of Man.'

Wordsworth, Southey, and Coleridge all greeted the Revolution with joy. Wordsworth had sojourned in France for a short period when all the land was 'mad with joy.' In one of his poems he exclaims 'Bliss was it in that dawn to be alive, but to be young was very heaven!' But when the Reign of Terror commenced, his views concerning the new life of man were shaken, and when this was succeeded by the Imperialism of Napoleon they ceased to exist.

Coleridge lost faith in France as the Champion of the new order of things when she attacked Switzerland, and in his 'Ode to Dejection' he expresses his sorrow on finding his ideals turn to clay.

II.—Questions already set upon 'Macbeth.'

1. Paraphrase lines 13 to 26 of Scene 2, Act 3.

2. Analyse the above passage from '*But let the frame*' to '*In restless ecstasy.*'

3. Parse *herself, whilst, remains, let, disjoint, suffer, that, mighty, better, whom, than,* of the above passage.

4. Explain the words: 'The *shardborne* beetle,' *trenched, slight, chaudron, deftly,* 'Thy title is *affeered*,' *foysons,* '*to latch* anything,' *fa-grief, to skirr, to cling, sleave.*

5. Paraphrase lines 144 to 155, Scene 1, Act 4.

6. Write out one of the passages beginning:—
   (*a*) '*Now o'er one half the world.*'
   (*b*) '*She should have died hereafter.*'

7. Explain the following quotations:—
   (*a*) Lines 75, 76, Scene 4, Act III.
   (*b*) Lines 110 to 112, Scene 4, Act III.
   (*c*) Lines 120, 121, Scene 2, Act IV.
   (*d*) Lines 23, 24, Scene 3, Act IV.
   (*e*) Lines 2 to 4, Scene 3, Act IV.
   (*f*) Lines 54 to 57, Scene 3, Act I.

8. Give an outline of the action in the first '*Act*' of Macbeth.

9. Mention the peculiarities of Shakespeare's versification, particularly the rhyming couplets.

10. Write a short essay on '*The character of Lady Macbeth.*'

11. Write a short essay on '*Poetical justice, as exemplified in the deaths of Banquo and Macduff's wife.*'

12. Paraphrase lines 49 to 56, Scene 1, Act II. (*Twice given.*)

13. Paraphrase lines 40 to 45, Scene 3, Act V.

14. Analyse lines 40 to 44, Scene 6, Act III.

15. Parse *absolute, me, as, should, say,* of last extract.

16. Give a definition of an epic poem and of a tragedy. Show from Macbeth that tragedy moves our passions in order to awaken virtuous emotions.

17. Illustrate from Macbeth the following: '*All Shakespeare's faults are amply redeemed by two of the greatest excellencies which a tragic poet can possess—his lively and diversified paintings of character, and his strong and natural expression of passion.*'

18. Paraphrase lines 53 to 72, Scene 5, Act I.

19. Paraphrase lines 57 to 81, Scene 1, Act III.

20. State what is known of the personal history of Shakespeare, and explain the position in which he stands with relation to his immediate predecessors and successors in English dramatic literature.

21. State fully Shakespeare's chief claim to pre-eminence amongst poets.

22. Give a short account of the plot of 'Macbeth,' and show how far it is consistent with historical tradition.

23. Draw out the contrast between the character of Lady Macbeth and that of her husband.

24. Comparing the diction of Macbeth with the English of today, give illustrations of the changes which our language has undergone, in the course of the last two centuries, in respect of—
   (*a*) Construction,
   (*b*) The usuage of particular words.

25. Write some remarks upon the progress of Shakespeare's character as supposed to be shown in the chronological order of his plays.

26. Paraphrase lines 130 to 137, Scene 4, Act I.

27. Explain the following:—*kerns and gallowglasses; with a new Gorgon; the armed rhinoceros, or the Hyrcan tiger; the pit of Acheron; the English epicures; crowned at Scone; nature's germins.*

28. Explain the following passages, stating the circumstances under which they occur:—
   (*a*) Lines 49, 50, Scene 3, Act I.
   (*b*) Lines 124 to 126, Scene 4, Act III.
   (*c*) Lines 79, 80, Scene 3, Act II.

29. Comment on the following passage from Mrs. Jameson's criticism of Lady Macbeth:—

'*She is a terrible impersonation of evil passions and mighty powers, never so far removed from our own nature as to be cast beyond the pale of our sympathies; for the woman herself remains a woman to the last—still linked with her sex and with humanity.*'

30. What are the chief excellencies of '*Macbeth*' considered as—
   (*a*) A representation of scenes and incidents,
   (*b*) A proof of Shakespeare's insight into human character and motive, and
   (*c*) A work of literary art?

From the above questions and examination papers, the most careless student cannot fail to gather the kind of queries propounded and the style of information required.

Next month we hope to furnish an exhaustive list of questions set upon '*Hamlet.*'

IV. The difficult words to be parsed from routine are as follows:—

First Year.

(*a*) Men. *Gareth, footing, so, was whirled, how, down, as, were, mine, to use, cataract, living.* (First Friday.)

(*b*) Women. *Times, space, vanquished, confounded, though, immortal, more, for, both, round, his, witness, mixed.* (First Friday.)

(*c*) Men. *Enid, whom, people, arose, Geraints, to be, more, rested, fighting, King.* (Second Friday.)

(*d*) Women. *Staid, to reply, glad, that, should, find, renewed, like, round, environed, harder, beset, than, when, steered.* (Second Friday.)

(*e*) Men. *Nay, mine, gold, than, can, lay, for, this, laid, almost, such, as, gilded, there, who, aloft, an, climb, then, were, leash.* (Third Monday.)

Second Year.

(*f*) Men. *As for First Friday of First Year.* (First Monday.)

(*g*) Women. *Wake, to-night, up-spring, reels, as, down, thus, bray, custom, marry, though, native, than, west, taxed, clepe.* (First Monday.)

(*h*) Men. *Former, have, but, which, interpret, only, say, have been borne, was pitied, too, whom, may, please, for, walk, cannot, fact.* (First Monday.)

V. (*a*) The names of all candidates for certificates, not being students in any Training College, must be notified to the Education Department before the 1st of October next.

(*b*) It is how too late for Acting Teachers to sit for Science or Drawing.

They cannot be admitted to these examinations held in the Training Colleges for students in residence.

(*c*) Each Acting Teacher should see that his name is duly entered on Form IX., with the words 'Christmas Examination' appended.

(*d*) Second-year students who passed in second or third classes last Xmas may sit again this December without waiting for another year to elapse.

(*e*) We again insert the following table, as numerous enquiries respecting the facts therein explained are constantly being forwarded.

Old Drawing Certificates and the New 'D.'

As several of our correspondents are in doubt as to the counting value of drawing certificates of various ages and classes we give the following table for reference. Its preservation will save trouble to our readers, the Science and Art Department, and ourselves.

	E. D. Certificate. (First Class.)	E. D. Certificate. (2nd Class.)
Freehand.	(i) Any second grade certificate for freehand obtained before the end of 1888, or (ii) A first class obtained since 1888.	Any second grade certificate for freehand.
Model.	(i) Any second grade certificate for model on paper obtained before the end of 1888, or (ii) A first class obtained since 1888, or (iii) A pass in model on the blackboard.	Any second grade certificate for model on paper or on the blackboard.
Geometry.	Either a pass in second grade geometry, or a pass in section ii. of Science Subject ii., plus any certificate for second grade perspective obtained before the end of 1888, or a first class obtained since 1888.	
Shading from Casts.	Any second grade certificate for drawing in Light and Shade.	

N.B.—Applicants for certificates may be required to be re-examined in any subject in which they have passed more than three years previously.

See also remarks on the new 'Science and Art Directory,' *supra*.

VI. Algebra Notes and Examples.

(*a*) If a oxen in m weeks eat b acres of grass, and c oxen eat d acres in n weeks, how many oxen will eat e acres in p weeks, the grass being supposed to grow uniformly?

Let x = number of oxen required.
" α = grass upon an acre at first.
" β = increase of grass upon an acre in a week.
$\therefore \alpha + m\beta$ = the grass on an acre in m weeks.
$\alpha + n\beta$ = " " n "
$\alpha + p\beta$ = " " p "
$\therefore b(\alpha + m\beta)$ = " b acres in m "
$\therefore d(\alpha + n\beta)$ = " d " n "
$\therefore e(\alpha + p\beta)$ = " e " p "

Now as it is plain that the quantity of grass eaten will vary directly as the number of oxen

$\therefore$ I. $b(\alpha + m\beta) : d(\alpha + n\beta) :: a : c$
and II. $b(\alpha + m\beta) : e(\alpha + p\beta) :: a : x.$

From I. we get $bc(\alpha + m\beta) = ad(\alpha + n\beta)$

$$\therefore \beta = \frac{(ad - bc)\alpha}{mbc - nad}.$$

From II. we get $x = \dfrac{ae(\alpha + p\beta)}{b(\alpha + m\beta)}$

$$= \frac{ae}{b}\left\{\frac{\alpha + \dfrac{p(ad-bc)}{mbc-nad}\alpha}{\alpha + \dfrac{m(ad-bc)}{mbc-nad}\alpha}\right\}$$

$$= \frac{ae}{b} \times \frac{mbc - nad + pad - pbc}{mbc - nad + mad - mbc}$$

$$= \frac{ae}{b} \times \frac{(m-p)bc - (n-p)ad}{(m-n)ad}$$

$$= \frac{e}{bd} \times \frac{(m-p)bc - (n-p)ad}{m-n}$$

$$= \frac{m-p}{m-n} \times \frac{ce}{d} - \frac{n-p}{m-n} \times \frac{ae}{b}. \text{ Ans.}$$

(*b*) The following practical method of finding the coefficient of $(a + x)^n$ is useful. Take $n = 5$ for example.

The first coefficient is = 1
" second " " $\frac{5}{1}$ of 1 = 5
" third " " $\frac{4}{2}$ " 5 = 10
" fourth " " $\frac{3}{3}$ " 10 = 10
" fifth " " $\frac{2}{4}$ " 10 = 5
" last " " $\frac{1}{5}$ " 5 = 1

Similarly when $n = 6$, the coefficients are 1, 6, $\frac{5}{2} \times 6 = 15$, $\frac{4}{3} \times 15 = 20$, $\frac{3}{4}$ of $20 = 15$, $\frac{2}{5} \times 15 = 6$, $\frac{1}{6}$ of $6 = 1$.

(*c*) Expand $(a + 2x)^6$.

Let $b = 2x$.

Then $(a + b)^6 = a^6 + 6a^5b + 15a^4b^2 + 20a^3b^3 + 15a^2b^4 + 6ab^5 + b^6$.

But after the first term (as $x = 2b$, and the power of b increases by unity each term) it is plain that the coefficients will be 2, 4, 8, 16, etc. times the given ones, *i.e.*, they will be 1, 12, 60, 160, 240, 192, 64.

The coefficients may be directly obtained thus—1, $\frac{6}{1} \times 2 = 12$, $\frac{5}{2} \times 2 \times 12 = 60$, $\frac{4}{3} \times 2 \times 60 = 160$, etc.

(*d*) Expand $(2x + 3z)^6$.

Let $2x = a$, and $3z = b$.

Then $(a + b)^6 =$ as in c.

Substituting, we get $(2x + 3z)^6 = 64x^6 + 576x^5z + 2160x^4z^2 + 4320x^3z^3$, etc.

Now as the powers of x uniformly decrease by unity, and the powers of z uniformly increase by unity, we may get the coefficients thus—

$1 \times 2^6 = 64$, $\frac{6}{1} \times \frac{3}{2} \times 64 = 576$, $\frac{5}{2} \times \frac{3}{2} \times 576 = 2160$, $\frac{4}{3} \times \frac{3}{2} \times 2160 = 4320$, etc.

SELECTED GOVERNMENT QUESTIONS.

FIRST YEAR.

Second Week.

1. Write in *Large-hand* the words '*Zephyr Breezes.*'
Write in *Small-hand* the words '*Fair laughs the morn and soft the zephyr blows.*'

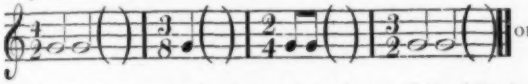
2. Write from Dictation:—
'Not only in politics, but in literature, in art, in science, in surgery and mechanics, in navigation and agriculture, nay, even in

mathematics, we find this distinction. Every where there is a class of men who cling with fondness to whatever is ancient, and who even when convinced by overpowering reasons have misgivings and forebodings. We find also every where another class of men sanguine in hope, bold in speculation, always pressing forward, quick to discern the imperfections of whatever exists, disposed to think lightly of the risks and inconveniences which attend improvements, and disposed to give every change credit for being an improvement.'

3. What associations of memory are most active in the case of very young scholars? Show that these may be gradually replaced by higher habits of association under skilful teaching.

4. What are the advantages of a general system of public examinations as affecting the standard of a school and its curriculum? To what abuses is such a system liable?

5. Add one note at the end of each of the following examples to complete the bar in accordance with the time signature :—



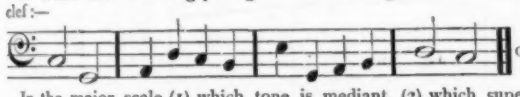
OR

Write the time names (as *taa*, or *taa-tai*, etc.) of the following pulses :—

(*a*) | 1., 1 : 1 || (*b*) | 1 : 1. 1 || (*c*) | : 1 ||

(*d*) | 1 :—. 1 || (*e*) | 1, 1. 1 : 1. 1, 1 ||

6. Write the following passage *two* octaves higher in the treble clef :—



OR

In the major scale (1) which tone is mediant, (2) which supertonic, (3) which sub-dominant, (4) and which the leading-note?

7. (*Men only.*) Give from Trench a list of words derived from names of places.

(*Women only.*) Gives reasons why Johnson was in some respects unfitted to write the life of Milton.

8. Analysis from Routine.

9. Map of Hindostan, giving only the principal states, towns, and productions.

10. Describe the positions of the chief cotton, tea, and coffee-growing districts of Asia.

11. Give dates of Treaty of Winchester, Capture of Jerusalem by Saladin, Battle of Bouvines, the Mad Parliament, Annexation of Wales, and Execution of Gaveston.

12. (*Men only.*) Give the principal events connected with Paris, Boston Harbour, Philadelphia, Bunker's Hill, and Gibraltar, from 1769 to 1783.

(*Women only.*) Describe the battle of Bannockburn, relating its causes and effects.

13. Show that the least integer which contains two or more fractions an exact number of times is the least common multiple of their numerators.

14. The net profits of a company for the half-year just ended amount to £60,451, and £10,297 is brought forward from the previous half-year. After transferring £20,153 to the reserve fund, and carrying forward £13,095 to the next half-year's account, sufficient is left to pay a dividend at 15 per cent. per annum. What is the capital of the company? Ans. £500,000.

15. (*Men only.*) The floor of a square room is covered with carpet ¾ yard wide at 3s. 4½d. per yard; the walls are painted at a cost of 2½d. per square foot; the carpet costs as much as the painting; the room is 12 feet high. Find the dimensions of the floor?
Ans. 6 yards square.

(*Women only.*) Explain fully how to lay and light (*a*) a close stove and (*b*) an open fire.

16. (*Men only.*) Solve the equations

(*a*) $\frac{4x-3}{2}-\frac{5x-4}{3}=\frac{6x-5}{4}-\frac{1}{12}$. Ans. $x=1$.

(*b*) $(x-3)(x-4)(x+12)=x^3$. Ans. $x=12$ or $2\frac{8}{9}$.

(*c*) $x+y=8$; $15x^2-34xy+15y^2=0$.
Ans. $x=5$ or 3, $y=3$ or 5.

(*Women only.*) Describe fully any washing machines known to you. Explain their advantages and show what precautions or rules should be observed in using them.

17. (*Men only.*) (*a*) Prove that the square of the sum of any two numbers + the square of their difference = twice the sum of the squares of the numbers.

(*b*) Prove that the sum of the cubes of three even numbers in arithmetical progression is divisible by 24.

(*Women only.*) State in what proportion respiratory, nitrogenous and mineral foods are necessary to health, and give examples of each of these kinds of food.

18. (*Men only.*) Write out Euclid III. 30.

Draw two tangents to a given circle which shall contain an angle equal to a given angle.

(*Women only.*) What cereals are used for food in this country? Name other starch foods, and the sources from which they are obtained.

19. (*Men only.*) Write out Euclid I. 24.

Describe a right-angled triangle upon a given base, having given also the perpendicular from the right-angle upon the hypotenuse.

(*Women only.*) A vulgar fraction has for its numerator 209, and its nearest approximate value in thousandths is ·511. What is its denominator? Ans. 409.

Fourth Week.

1. Write in *Large-hand* the words: '*Objectionable Query.*'
Write in *Small-hand* the words: '*Proudly riding o'er the azure realm.*'

2. Write from Dictation :—

'The original right of property can only be justified by the accident, or merit of prior occupancy; and on this foundation it is wisely established by the philosophy of the civilians. The savage who hollows a tree, inserts a sharp stone into a wooden handle, or applies a string to an elastic branch, becomes in a state of nature the just proprietor of the canoe, the bow, or the hatchet. The materials were common to all, the new form, the produce of his time and simple industry belongs solely to himself.'—*Gibbon*, v. 402.

3. Discuss the advantages and disadvantages of teaching the earlier stages of reading by the Phonic process.

4. How is the teaching of Geography promoted by the use of blank maps, by maps of a familiar locality, and by map-drawing?

5. Write the signatures of the following major-keys :—E♭, D♭, B in treble clef, and F, B, E in the bass clef, OR
State the names of (1) the strong tones of the scales, (2) the leaning tones, (3) those tones that have the greatest leaning tendency.

6. Give the names of each of the following intervals :—

G ; B♭ ; E ; A♭ ; C♯ :
E♭ ; F ; F♯ ; G ; E : OR

Soh ; Ta ; M¹ ; Se ; De
Ma ; Fah ; Fe ; S ; M

7. (*Men only.*) Give from Trench a list of words derived from mythical antiquity.

(*Women only.*) What do you know of Milton's appearance and habits?

8. Analysis and parsing from Routine.

9. Describe the island of Cyprus. With what European nations has its history been connected?

10. Enumerate the rivers of Asia which flow into the Arctic Ocean and give a full description of one of them.

11. Criticise Edward III.'s claim to the crown of France. What effect had the French wars upon the Feudal System?

12. (*Men only.*) Name the chief statesmen during the reign of George II., and write a life of Chatham.

(*Women only.*) Give the chief provisions of the Statute of Labourers, Statute of Treason, and Statute of Provisors.

13. Subtract the square of 2¼ from the square root of $62\frac{1}{4}\frac{8}{9}\frac{8}{9}$.
Ans. $1\frac{8}{12}\frac{1}{12}$.

14. I invested £4257 in 2¾ per cent. consols at 96¾, and subsequently sold out half my holding at the same price, investing the proceeds in 5 per cent. Indian Railway Stock at 120¼. Find the difference in my income (reckon brokerage at ¼ p. c.).
Ans. £27 10s.

CERTIFICATE ROUTINE FOR SEPTEMBER 1893 (MEN AND WOMEN, FIRST YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	The Nature and Maintenance of Discipline	Read 'Trench,' Lecture V., *or* Johnson's 'Milton,' pp. 80 to 94 (Notes)	Euclid, Book III., Props. 21 to 32, *or* Repairing Underclothing	Notes of a Grammar Lesson to Standard V. *or* on 'Form'	Study Notes of 'Gareth and Lynette,' pp. 45 to 59, *or* read Johnson's 'Milton,' pp. vii. to xxiv. (Introduction)	Euclid, Book III., Props. 32 to 37, *or* Diagram of an Infant's Shirt	The General Principles of Teaching	Analyse lines 41 to 51 of 'Gareth and Lynette,' and Parse difficult words, *or* Study Notes on Lines 1 to 176 of 'Paradise Lost,' Book I.	Euclid, Book III., Props. 1 to 8, *or* Any Needlework	The Cultivation of the Intelligence	Study Notes of 'Geraint and Enid,' pp. 91 to 100, *or* Grammar from Text-book	Euclid, Book I., Props. 27 to 48, *or* Questions on Needlework
TUESDAY	Chief Dates from 1274 to 1377	Arithmetical Problems *or* Mental Arithmetic	Russia in Asia	Chief Dates from 1377 to 1461	Mental Arithmetic	China	Constitutional Changes during 18th Century *or* Lives of Great Men from 1376 to 1461	Mensuration of the Circle *or* Compound Proportion	Effect of Climate upon Industry, Production, and National Character	Chief Dates from 1461 to 1509	Proofs of the formulæ of the Progressions *or* Ventilation	Persia
WEDNESDAY	Algebraic Proofs of G.C.M. and L.C.M. *or* Construction of the House	Write an Essay upon 'Free-Trade'	Corporeal Exercises at School	Simultaneous Equations of one degree *or* Furnishing of the House	Clock Sums *or* Mixed Fractions	Repetition, Penmanship, etc.	Simultaneous Quadratics *or* Cleanliness of the Home	General Arithmetical Problems	Euclid, Book I., Prop. 1 to 26, *or* Cutting-out of a Woman's Chemise	Geometrical and Harmonical Progressions *or* Respiration	Compound Proportion	Repetition, Penmanship, etc.
THURSDAY	History from 1216 to 1274	Mensuration of Parallelograms *or* Compound Practice	Map of British Hindostan	History from 1274 to 1377	Proofs of Propositions in Ratio and Proportion *or* Warming and Lighting of the Home	Causes which affect Climate	Military Affairs from 1066 to 1135	Problems on Simultaneous Quadratics *or* Uses of Air	Map of Palestine	History from 1700 to 1727 *or* Revision	Mental Arithmetic	Distribution of Plants and Animals
FRIDAY	Repetition, Penmanship, etc.	Deductions of Euclid, Book I., *or* Diagram of a Woman's Chemise	Analyse Lines 1 to 10 of 'Gareth and Lynette' *or* Lines 50 to 60 of 'Paradise Lost,' Book I., Parse difficult Words	Most Important Laws of the Period	Deductions of Euclid, Book II., *or* Cutting-out of an Infant's Shirt	Analyse lines 960 to 969 of 'Geraint and Enid' *or* Lines 1010 to 1020 of 'Paradise Lost,' Book II., Parse difficult Words	Repetition, Penmanship, etc.	Deductions of Euclid, Book III., *or* Any Needlework	Read 'Trench,' Lecture VI., *or* Johnson's 'Milton,' pp. 94 to 108 (Notes)	Theory of Quadratic Equations and Repeating Decimals *or* Organs of Respiration	Any Revision	Write an Essay upon 'Honesty in Politics' *or* Study Notes on Lines 177 to 360 of 'Paradise Lost,' Book I.
SATURDAY	The Inter-relationship of the Mental Faculties	Music—the Tonic, Sub-Dominant, Dominant, etc.	Examination	Revise any School Management	Music—Transposition *or* Octave Marks, Standard Pitch, and Key-Relationships	Examination	How to Teach Geography *or* 'Colour'	Music—Value of Notes and Rests *or* Pulses and Accents	Examination	Training of the Memory	Music—Signature of the *Simple* Times *or* Two, Three, and Four Pulse Measures	Examination

CERTIFICATE ROUTINE FOR SEPTEMBER 1893 (MEN AND WOMEN, SECOND YEAR).

CERTIFICATE ROUTINE FOR SEPTEMBER 1893 (MEN AND WOMEN, SECOND YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	Formation of Habits and Character	Analyse (and Parse difficult words of) Lines 1 to 18 of 'Gareth and Lynette' *or* Lines 8 to 19 of Scene 4, Act I., of 'Hamlet'	Euclid, Book III., Props. 24 to 32, *or* Whipping and Feather-Stitching	'Herbert Spencer,' pp. 74 to 92, *or* 'Quick,' Chapter XIII.	Composition upon 'Discipline and its Results'	Euclid, Book III., Props. 32 to 37, *or* Write down directions for Making a Child's Muslin Pinafore	Form 'VIII. M,' and the salient points of the Code	Analyse (and Parse difficult words) from Lines 1 to 10 of Scene 6, Act III., 'Macbeth' *or* Lines 53 to 65 of Scene 4, Act IV., 'Hamlet'	Deductions upon Euclid, Book II., *or* Darning with Stocking-web Stitch	'Herbert Spencer,' pp. 1 to 23, *or* 'Quick,' Chapter XVI.	Composition upon 'The Art of Seeing'	Euclid, Book III., *or* Cutting out on Paper a Boy's Shirt and a Child's Pinafore
TUESDAY	As in First Year *or* History from 1485 to 1509	Square Root	As in First Year *or* Physical Geography of England	As in First Year *or* Dates from 1558 to 1580	Division into Proportional Parts	As in First Year *or* Political Geography of England	As in First Year *or* Literature from 1485 to 1544	Percentages	As in First Year *or* Climate, Productions, Commerce of England	As in first Year *or* Family and National Alliances of the Tudors	Theory of Proportion	As in First Year *or* Political Geography of Australia
WEDNESDAY	Repetition, Penmanship, etc.	Binomial Theorem *or* Antidotes of Common Poisons	School Premises	Permutations and Combinations *or* How to treat Burns, Scalds, Dog-bites, Nose-bleeding, and Fainting	Repetition, Penmanship, etc.	Paraphrase Lines 96 to 110 of Act III., Scene 4, 'Macbeth,' *or* Lines 138 to 153 of Scene 4, Act III., of 'Hamlet'	Binomial Theorem *or* Qualities and Training of a Maid-servant	Revise Jevons' Logic	Binomial Theorem *or* Puddings	Revise Jevons' Logic	Theory of Quadratics *or* Infection and Contagion	As in First Year *or* Political Geography of United States
THURSDAY	As in First Year *or* History from 1509 to 1528	Problems on G.C.M. and L.C.M.	As in First Year *or* Map of Southern England	As in First Year *or* Dates from 1580 to 1603	Chain Rule *or* School Cookery Classes	As in First Year *or* Physical Geography of Australia	As in First Year *or* Plots and Revolts under the Tudors	Miscellaneous Arithmetical Problems	As in First Year *or* Map of Eastern half of Australia	As in First Year *or* Literature from 1544 to 1603	Alligation	As in First Year *or* Geography of Australia
FRIDAY	Logarithms *or* Disinfectants	Deductions on Euclid, Book I., *or* Diagram of a Woman's Night-dress	Study Trench, Lecture IV., *or* 'Advancement of Learning,' pp. 99 to 114 (Notes)	Ratio and Proportion *or* Revise the Composition of Food	Euclid, Book IV., Props. 1 to 8, *or* Diagram of a Boy's Shirt	Read first half of 'Geraint and Enid' *or* 'Advancement of Learning,' pp. 115 to 130 (Notes)	Difficult Quadratics *or* Choice and Cooking of Fish	Euclid, Book IV., Props. 9 to 16, *or* Making of a Child's Muslin Pinafore	Paraphrase Lines 745 to 758 of 'Geraint and Enid,' *or* Lines 12 to 23 of Scene 1, Act IV., 'Hamlet'	Theory of Involution and Evolution *or* Pigs and Poultry Keeping	Deductions upon Euclid, Book II., *or* Making of a Boy's Shirt	Study 'Macbeth' *or* 'Hamlet'
SATURDAY	Notes of a Lesson on Simple Practice *or* Upon 'White and Black,' for Infants	Music—Compass and Registers of Voices	Examination	Classification of Scholars and Home Lessons	Music—Training of the Voice	Examination	Notes of a Lesson on 'Volcanoes' *or* 'The Fee,' for Infants	Music—The Simple Times *or* All the Measures in common use	Examination	Organisation of Half-Time and Mixed Schools	Music—Major and Minor Scales *or* Major and Minor Modes	Examination

15. (*Men only.*) Regular hexagons are inscribed in circles whose radii are 3 feet and 5 feet. What is the area of the circle in which the area of the inscribed hexagon is a mean proportional between the areas of the two former hexagons? Ans. 47¼ sq. ft.

(*Women only.*) What injurious practices prevail in this country with regard to clothing, more particularly among young girls? What organs are affected when young children are insufficiently clothed?

16. (*Men only.*) A bag contains sovereigns and shillings. If the number of sovereigns is doubled, the contents of the bag will be worth £21, but if the number of shillings be doubled the contents will only be worth £12. Find how many coins of each sort are in the bag. Ans. £10; 20s.

(*Women only.*). What are the chief seats in the British Isles for the manufacture of clothing from the following materials:—flax, cotton, silk, leather, wool? Name the various materials produced from cotton.

17. (*Men only.*) Prove that a ratio of greater inequality is diminished, and a ratio of less inequality increased by adding the same to both of its terms.

(*Women only.*) Describe the repair of a hedge-tear in a flannel petticoat.

18. (*Men only.*) Write out Euclid III. 32.
If two circles intersect, the common chord produced bisects the common tangent.

(*Women only.*) Cut out in paper the left half of the front and back of a woman's chemise.

19. (*Men only.*) Write out Euclid II. 12.
Find the side of a square equal to a given equilateral triangle.

(*Women only.*) What is meant by an *aliquot part*, *discount*, *consols*, *ratio*, *proportion*, and *square root*?

SECOND YEAR.

Second Week.

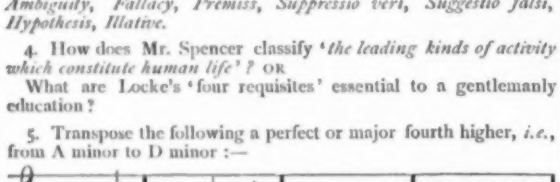
1. As in First Year.

2. As in First Year.

3. Explain and illustrate by examples the following terms:—*Ambiguity*, *Fallacy*, *Premiss*, *Suppressio veri*, *Suggestio falsi*, *Hypothesis*, *Illative*.

4. How does Mr. Spencer classify '*the leading kinds of activity which constitute human life*'? OR
What are Locke's 'four requisites' essential to a gentlemanly education?

5. Transpose the following a perfect or major fourth higher, *i.e.*, from A minor to D minor:—



Write figures over the following to indicate their value (as 1 pulse, ½ pulse, etc.) of each note and rest:—

| r,f,s : d. | r,- ,f : s. | l,, s : f,r,r | s :-. ‖

6. Note tests for Division IV. in Schools include:—
'*A simple passage in a minor key, containing accidentals to raise the fourth of the scale* (*approached by the third or fifth*) *and to flatten the seventh* (*approached by the key-note*) *properly contradicted.*'
Write two passages (one in A Major and one in E♭ Major) of about twenty notes each in accordance with these requirements. Write a semibreve for each note, and do not add bars. OR
(*a*) *A simple passage in the Major key containing a transition of one remove indicated by bridge notes*; and
(*b*) *A short passage in the Minor key introducing* se (*used thus, l, se, l*), *but without introducing f, bah, or soh.*
Write two passages of about twenty notes each (without time) in accordance with these requirements.

7. (*Men only.*) As in First Year.
(*Women only.*) Write out ten lines subsequent to
(*a*) '*O that this too, too solid flesh would melt,*' and
(*b*) '*To be or not to be, that is the question.*'

8. Paraphrase from routine.

9. (*Men only.*) As in First Year.

(*Women only.*) Draw the coast-line of that part of the eastern half of Australia which is south of the tropic of Capricorn. Mark in the physical features of the interior and seven of the largest towns.

10. (*Men only.*) As in First Year.
Give some account of the aboriginal inhabitants of Australia and New Zealand respectively.
Mention what you know of our relations with these races.

11. (*Men only.*) As in First Year.

(*Women only.*) Give dates of Statute of Six Articles, Rout of Solway Moss, Execution of Surrey, Act of Uniformity, Proclamation of Lady Jane Grey, Martyrdom of Cranmer.

12. (*Men only.*) As in First Year.

(*Women only.*) Describe the circumstances which led to the disgrace and execution of Essex.

13. (*Men only.*) Reduce to its simplest form

$$\frac{\cdot 30\dot{5}}{\cdot 04275} \times \frac{\cdot 3\dot{4}2}{4\cdot 21\dot{6}} \times \frac{1\cdot 5318}{\cdot 2\dot{7}}$$ Ans. 160.

(*Women only*) As in First Year.

14. (*Men only.*) Find the cube root of 1277289½. Ans. 108½.

(*Women only.*) Multiply 3·14159 by ·69897 correctly to seven places of decimals. Ans. 2·1958771.

15. (*Men only.*) A solid cone and a hollow cone stand on equal bases and contain the same amount of material. The internal radius of the base of the hollow cone = $\frac{9}{10}$ of the external. Find the ratio of the heights of the two cones. Ans. As 271 : 1000.

(*Women only.*) Darn a hole in stocking-web stitch.

16. (*Men only.*) Write out Euclid I. 41.

Given the base PQ and QR, one of the sides of the triangle PQR, find the value of the angle PQR, for which the triangle PQR is the greatest.

(*Women only.*) How should you plan a course of eighteen lessons for a cookery class consisting of girls of fourteen?

17. (*Men only.*) Write out Euclid VI. 15.
Construct an isosceles triangle equal to a given scalene triangle and having the same vertical angle.

(*Women only.*) Give a scheme of a week's cheap dinners for a working man's table with family of five persons.

18. (*Men only.*) For 3s. two yards more of cheap calico can be bought than of better quality, and 10 yards of the latter cost 6d. more than 12 yards of the former. Find the price per yard of each quality. Ans. 7s. 3d. and 8s. 9d.

19. (*Men only.*) Define arithmetical and harmonical progression. Show that if $a + b$; $c + a$; $b + c$, be in H. P. then a^2, b^2, c^2 are in A.P.

(*Women only.*) As in First Year.

Fourth Week.

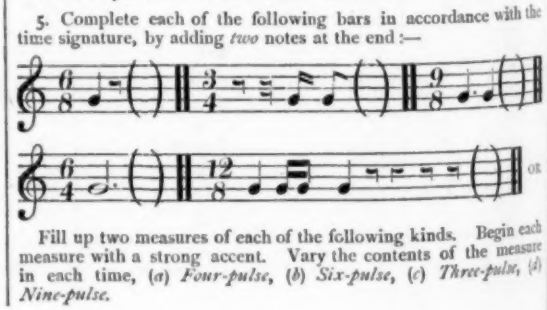
1. As in First Year.

2. As in First Year.

3. What are the objects to be kept in view in teaching History in schools? What kind of historical facts possess most interest and value in the instruction of young children?

4. In what sense does Mr. Spencer use the word 'Science,' and how does he justify his reply to the question, '*What knowledge is of most worth?*' Say if in any respects that reply appears to you inadequate, or requires any addition, OR
What do you know of Pestalozzi's '*Leonard and Gertrude.*'

5. Complete each of the following bars in accordance with the time signature, by adding *two* notes at the end:—



Fill up two measures of each of the following kinds. Begin each measure with a strong accent. Vary the contents of the measure in each time, (*a*) *Four-pulse*, (*b*) *Six-pulse*, (*c*) *Three-pulse*, (*d*) *Nine-pulse.*

6. Time tests for Division IV. in schools include :—

Series of notes, including rests, not shorter than a crotchet, in $\begin{matrix}2&4&3\\2&4&4\end{matrix}$ *times, which may include dotted minims and dotted crotchets.*

Write two passages (on the G line throughout) one in $\frac{3}{4}$ time and one in $\frac{2}{2}$ time of four bars each in conformity with these requirements. Vary the contents of the bars in each time, OR

Series of notes in two-pulse, three-pulse, or four-pulse measure, including pulse-and-a-half notes.

Write two passages, one in three-pulse and one in four-pulse measure, of four measures each in conformity with these requirements. Use no rests shorter than a whole pulse, and no signs shorter than a half-pulse. Write the pulse signs plainly and boldly, and use *d* for the notes throughout. Vary the contents of the measure in each time.

7. (*Men only.*) Write out the ten lines subsequent to

(*a*) '*The raven himself is hoarse*
That croaks the fatal entrance of Duncan.'

(*b*) '*Blood hath been shed ere now in the olden time.*'

(*Women only.*) Where and what are 'The Levant,' Arbela, Thebes, Scythia, Arcturus, and Troy.

8. Analyse and parse from Routine.

9. (*Men only.*) As in First Year.

(*Women only.*) What is the present form of government in West Australia? What change in proposed, and with what limitations as to territory?

10. (*Men only.*) As in First Year.

(*Women only.*) '*The structure of the land together with the latitude causes the interior of Australia to be one of the most arid regions of the earth.*' Explain and illustrate this statement.

Compare the vegetation of Victoria with that of Ireland.

11. (*Men only.*) As in First Year.

(*Women only.*) Name the children of Henry VII. and give an account of their marriages respectively.

12. (*Men only.*) As in First Year.

(*Women only.*) What famous foreign monarchs were contemporary with Henry VIII.? In what wars was he involved at various times?

13. (*Men only.*) A tradesman who professed to sell his goods 25 per cent. under cost price, explained that what he called cost price was really 30 per cent. above it, and that he expected to clear 5 per cent. profit. Find (*a*) what percentage he really gained or lost, and (*b*) what was the amount of gain or loss on goods sold for £92 12s. 6d. Ans. Loss, $2\frac{1}{2}$ per cent.; Loss, £2 7s. 6d.

(*Women only.*) As in First Year.

14. (*Men only.*) When the two-and-a-half per cents. are at $92\frac{1}{2}$, and two-and-three-quarter per cents. at $97\frac{1}{2}$, a person has a sum to invest which will purchase £100 more of the former stock than of the latter. Find the difference (neglecting brokerage) in the income which he could obtain by investing in the more profitable stock.

Ans. £2 2s. 6d.

(*Women only.*) One pendulum oscillates in $\frac{57}{56}$ of a second, and another in $\frac{59}{58}$ of a second. If they started simultaneously at one o'clock, how often will they tick together by two o'clock?

Ans. 458, including the start.

15. (*Men only.*) The bottom of a symmetrical tank 6 feet deep is a rectangle 8 feet by 5 feet; the top a rectangle 10 feet by 7 feet. Find how many gallons of water it contains, reckoning $6\frac{1}{4}$ gallons for every cubit feet. Ans. 2·036¼ gallons, nearly.

(*Women only.*) Draw on sectional paper the patterns of the three required garments.

16. (*Men only.*) Write out Euclid II. 9.
Prove this proposition *also* from Euclid II. 4 and 5.

(*Women only.*) Give an account of the ordinary duties of a housemaid in a family where three servants are kept.

17. (*Men only.*) Write out Euclid VI. 14.
Prove that the equilateral triangle described on the hypotenuse of a right-angled triangle is equal to the sum of the equilateral triangles described on the sides.

(*Women only.*) How may (*a*) Rice, (*b*) Barley, and (*c*) Maize be used advantageously as food for invalids and young children?

18. (*Men only.*) Having the number of combinations of n things taken r at a time, find the number taken $r+1$ together.

In a company of 80 soldiers, 5 are detailed daily for fatigue duty. How many different selections can be made, and on how many occasions will a given soldier escape duty.

Ans. 24,040,016; 22,537,515.

19. (*Men only.*) Find the coefficient of the term involving $x^n y^n$ in the expansion of $(1+x+y+xy)^{2n}$.

Ans. $\left(\frac{\lfloor 2n}{\lfloor n}\right)^2$.

(*Women only.*) As in First Year.

CORRESPONDENCE.

We shall be pleased to reply briefly through these columns to any SUBSCRIBER *seeking examinational information or advice, and* ENCLOSING THE NECESSARY COUPON.

This privilege does not, of course, extend to furnishing the solutions and answers of problems. All such communications should be addressed to 'THE QUERY EDITOR.'

Replies demanding urgency will be promptly forwarded per post on the receipt of a stamped and addressed envelope, ACCOMPANIED BY THE REQUISITE COUPON.

A post will be saved by writing direct to DR. GEORGE BEACH, M.A., (*Examination Editor of* '*Practical Teacher*'), STANLEY MOUNT, MACCLESFIELD.

L. P. (Stratton); W. W. (Lincoln); R. C. (Weston), See paragraph IV. (e) of Article; MAY (Plymouth), Two Elementaries count as one Advanced. See Syllabus. H. P. (Skipton in Craven), The Questions are not beyond ordinary Euclid deductions; S. L. (Westminster), Received report with thanks; F. P. (Crewe), Write to Manager, Stoke R.S.; M. M. B. (Mildmay Park), Forwarded to office.

ANSWERED PER ORDINARY LETTER.

L. J. (Faversham); M. B. (Goostrey); R. R. (West Bromwich); F. J. S. (Devonport); J. W. (Pontypridd); W. E. M. (Wilsden); W. J. W. (Winchfield); H. J. S. (Eynsham); 'BARKS' (Faringdon); L. A. J. (Cromtwrch); J. H. W. (Heaton Park); S. K. S. (Dewsbury); 'P' (Gosport); N. D. (Longport); G. H. (Bridgewater); S. W. (Bilston); W. B. W. (Nantwich); A. C. (Maldon); R. R. (West Bromwich); A. P. (Uxbridge); G. F. (Trowbridge); A.C. (Loughborough); T. E. D. (Buxton); H. G. (Bristol).

'AMY.'—The Drawing Inspector should accept the Attendance Officer's Certificate.

EILEEN, C. (Preston).—See Article.

TEACHERS' DRAWING LESSONS.

SOLID GEOMETRY OR PROJECTION.

STANDARD VII.

BY E. BUFFERY RIDGE,
Art Master under the London School Board.

Use the letters x, y, to indicate ground line.

Circles.—A plane circle may be viewed so as to appear—

1. As a circle.
2. As a line equal in length to the diameter of the circle.
3. As an ellipse, the long axis of which is equal to the diameter of the circle and the short axis any length less than the diameter.

A large circle cut out of cardboard should be used to illustrate various positions, and small circles of paper should be supplied to the pupils. A pair of dividers, used to describe a circle on stiff drawing-paper, and passed round several times with some slight pressure on the point, will cut the paper sufficiently to allow of the circle being readily torn out.

V. *Horizontal Circles. Given either plan or elevation to obtain the other projection.*

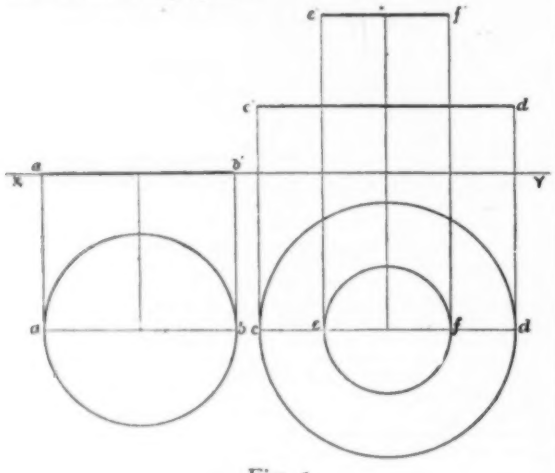


Fig. 5.

AB, $\frac{3}{4}$" radius, on the ground.
CD, 1" radius, $\frac{1}{2}$" high.
EF, 1" diameter, $1\frac{1}{4}$" above horizontal plane.
The centres to be $1\frac{1}{4}$" from the vertical plane.

VI. *Vertical circles parallel to the vertical plane. Given either projection to obtain the other.*

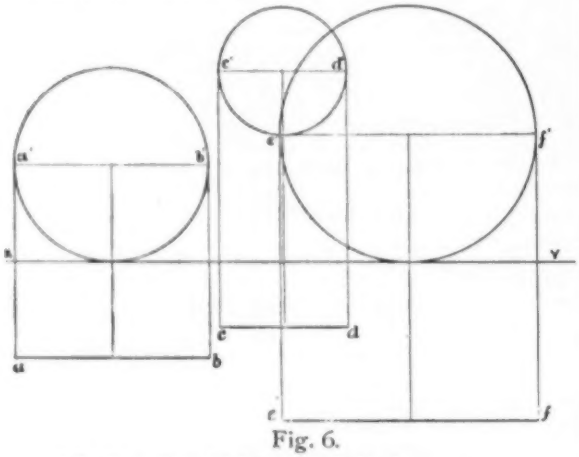


Fig. 6.

AB, $\frac{3}{4}$" radius, $\frac{3}{4}$" from vertical plane.
CD, $\frac{1}{2}$" radius, $\frac{1}{2}$" from vertical plane.
EF, 1" radius, $1\frac{1}{4}$" from vertical plane.

VII. *Vertical circles not parallel to the vertical plane. Given the plan to find the elevation.*

1. At right angles to V.P. The circle will be seen edgeways both in plan and elevation, and its projections will be two straight lines, each equal to the diameter.

2. Lay the circle down flat to obtain an auxiliary elevation similar to the aux. plan used in V. The centre is O. Divide the circumference into eight equal parts, 1 to 8. Consider *ab* as an aux. ground line; the distances of the points 1 to 8 from *ab* will be the heights of the points above the ground. Draw projectors from them at right angles to *ab*, obtaining points in the plan *abcde*. From these draw projectors up at right angles to *xy* and mark on each above *xy* the heights or distances of corresponding

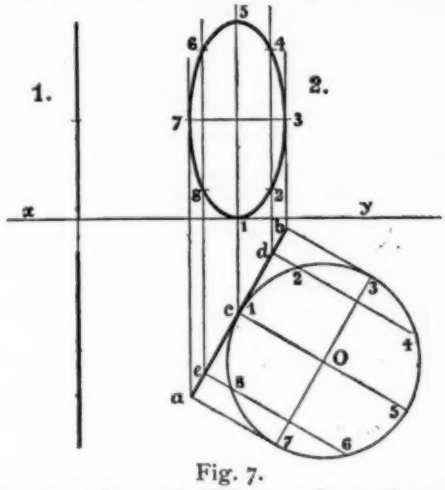


Fig. 7.

points 1 to 8 from *ab*. Thus, on the projector from *a* mark *a*7 above *xy*; on that from *e* mark *e*8 and *e*6, and so on. From 1 to 8 in elevation is equal to the diameter; heights of 2 and 4 equal heights of 8 and 6; height of 3 equals height of 7. Draw by hand an ellipse through the eight points obtained in elevation.

VIII. *Work the same problem by the following shorter method.*

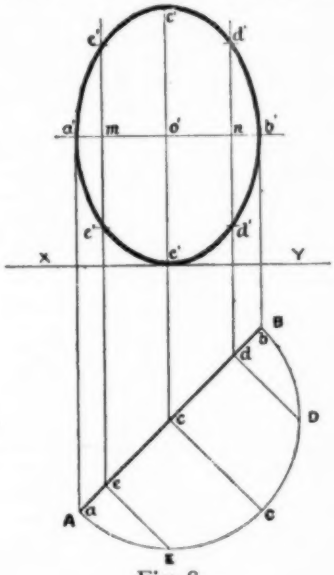


Fig. 8.

As the height of the centre is known (the radius), draw a semicircle on the plan, and divide it into four equal parts, projecting the points DCE to *dce*. Draw projectors from *abcde*, and at the height of the centre draw *a' b'* parallel to *xy*. From *m* on *a' b'* mark off above and below on the projector from *e* the distance *e*E taken from the plan. From *o'* mark *c*C, and from *n* mark *d*D. Eight points are now obtained in elevation. Draw the ellipse. Use this method generally, and the other occasionally. The principle is the same in both.

IX. *Circles inclined to the ground, but at right angles to the V.P.*

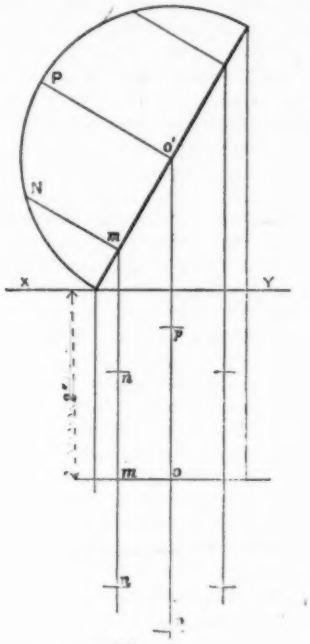


Fig. 9.

These will be seen edgeways in elevation. The work is the same as in VIII., but upside down.

Let the centre of the circle be 2″ from the vertical plane. If no distance is given take any distance.

o′P in elevation gives *op*, *op* in plan. *m*N gives *mn*, *mn*, &c. Draw the ellipse.

X. *Elevations of two unequal circles* AB—BC *are given. Draw the plans touching each other.*

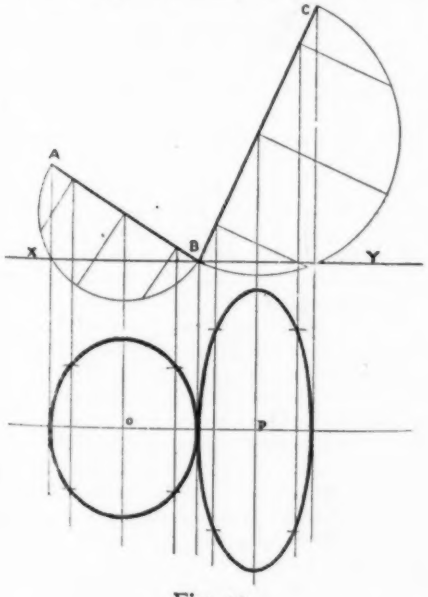


Fig. 10.

The centres *op* must be in the same line, or the plans would not touch.

SKETCHES OF MODERN EDUCATIONAL REFORMERS.

VI.—JULES GABRIEL COMPAYRÉ,

The French Historian of the School-men.

BY THOMAS CARTWRIGHT, B.A., B.SC. (LOND.),

Author of 'Mental Science and Logic for Teachers.' Co-Director of the Birkbeck Training Classes and Lecturer therein on School Method.

PEDAGOGY may be regarded from three points of view—the practical, the theoretical, and the historical. In its own particular way, each of these divisions of educational lore is pregnant with suggestiveness and replete with wisdom to the mind of the discriminating student. Uncomplimentary and withal unpatriotic as may appear the statement that England, amongst foremost civilised nations, is foremost in its callous contempt for the theory of education and apathetic disregard of the teachings of history on this vital question, the impeachment—by no means a soft one—is undeniably and incontestably true. In proof of this, take the history of education, and we find that, just as Shakspeare spelt ruin to those English actors and managers who were sufficiently callow to stage and produce his plays, so disaster has been the harvest of both author and publisher in those instances where an attempt has been made to cull from the archives of the past the flower of pedagogic wisdom for the edification of the latter-day pedagogue. Even the Education Department considers that *rara avis*—the 3 years' trained teacher—may be excused any compulsory dipping into the well of educational history, for it simply names 'Quick's Reformers' as an alternative book. These things, at all events, they manage much better elsewhere. In France, for example, by the Resolution of 3rd August, 1881, under 'History of Pedagogy,' we find it laid down that every student must be well acquainted with the principal educators and their doctrine, and must be prepared with an analysis of the more important of their works. This regulation owes much to the worker whom we now proceed to sketch. In the Department of Tarn, South-West France, is situated the small town of Albi, wherein, on January 2nd, 1843, Jules Gabriel Compayré entered the ranks of the mortals; and, although at this time he is only in his 51st year, his achievements have gone far to entitle him to a place in the ranks of the educational and literary immortals. Such success implies both ability and perseverance, which implication, upon examination, is found to correspond with stern fact. His education, begun by his father, was successively carried on at the college of Castres, the lycées of Toulouse and Louis le Grand (Paris) until, in 1862, he entered the École Normale Supérieure.

The bent of his mind was in the direction of philosophy. Pursuing the experimental methods recommended by Bacon, of whom he was an earnest student, he set himself to the study of man both in the family and in society, his aim being the discovery of the rules and principles which must be followed in order to develop the individual mentally, morally, and physically. In a word, he studied that which he was preparing to work upon—a wise proceeding

worthy of universal emulation by would-be successful preceptors. An ardent yet discriminating admirer of Rousseau, whose influence upon the government and education of his country he could plainly discern, we are not surprised to find him lecturing upon this Reformer, when, after graduation at the École Normale in 1865, he was appointed Professor of Philosophy at the Pau lycée, which lecture brought upon him the severe displeasure of the Ultramontane party.

From Pau, after becoming a Fellow of his University, he was sent to the lycée at Poictiers, where he interested himself in the social upliftment of the working men, giving many lectures to them for this purpose. For a discourse on Rousseau he received honourable mention from the Academy; and in 1874 he proceeded to his Doctor's Degree, taking for his theme the Philosophy of David Hume, for whom he had great respect. Indeed, he shows himself an earnest appreciator of English philosophic thought in all its branches, for later on—1874–1880—he translated into French Bain's 'Logic' (Deductive and Inductive); Locke's 'Thoughts on Education'; and Huxley's 'Hume' ('English Men of Letters'). In addition, he wrote, during this same period, 'A Study of Darwinism'; 'The Psychology of Childhood'; 'Educational Principles.' His 'History of the Doctrine of Education in France since the 16th Century' has run through four editions, and has been translated in its entirety into German, and partially into many other languages. He has contributed much to the *Revue Philosophique*, and to the *Dictionnaire de Pédagogie*. On July 14th, 1880, he was made a Chevalier of the Legion of Honour, and in 1881 he was called upon by the Minister of Public Instruction to organise the École Normale Supérieure des Institutrices de Fontenay-aux-Rose (Training College for Mistresses). So successful was his accomplishment of this congenial task that he was called upon to perform the same office when, in the same year, new Training Colleges for men were instituted at Sèvres and St. Cloud. In 1880 he published a Manual of Civil and Moral Instruction which met with such unique success that nearly half a million copies of the work were sold within three years of the date of publication. The Department of Tarn marked its sense of the worth of its son by electing him deputy for the arondissement of Lavour in 1881.

In October of last year was published in Heineman's Great Educator Series an excellent account of Abelard and the foundation of the Universities, by Jules Gabriel Compayré, rector of Poictiers, wherein, like Quick, he bears testimony to American support of works on the science and art of education in the following words: 'I trust also that literary dictionaries of the future, if they should grant me a place in their pages, will have the goodness, when they mention my name to follow it with this notice,—Gabriel Compayré, a French writer, whose least mediocre work, translated into English before being printed, was published in America.' His History of Pedagogy has been translated by Prof. W. H. Payne, of Michegan University, and is published by Messrs. Ginn and Heath, of Boston. To this book we are mainly indebted for the chief facts of Compayré's life. The necessity for such a history, and the kind of assistance which it is calculated to render, is thus admirably expressed in the work above referred to. It is for our readers, especially those who may have a voice in influencing the curriculum of our Training Colleges, to determine in their heart of hearts whether or no the contention is true. 'The desirable thing just now is not so much to find new ideas as properly to comprehend those which are already current; to choose from among them, and, a choice having once been made, to make a resolute effort to apply them to use. When we consider with impartiality all that has been conceived or practised previous to the 19th century, or when we see clearly what our predecessors have left us to do, in the way of consequences to deduce, of incomplete or obscure ideas, to generalise or to illustrate, and, especially, of opposing tendencies to reconcile, we may well inquire what they have left us to discover. In truth, for him who has an exact knowledge of the educators of past centuries, the work of constructing a system of education is more than half done. It remains only to co-ordinate the scattered truths which have been collected from their works by assimilating them through personal reflection, and by making them fruitful through psychological analysis and moral faith.' Believing this doctrine to be sound, it passes the wit of man to understand how our pastors and masters at Downing Street, and at the various Training Colleges, can be so culpably negligent or ignorant as to exclude the compulsory study of what the past has to teach in this connection. To show how interesting the annals of the school may be, we proceed to give an outline of the plan of the work in question, together with a few excerpts therefrom.

In the proem we are told that the subject matter is the result of the lectures given for three years past, either at the Higher Normal School of Fontenay, or in the normal courses for men at Sèvrés and St. Cloud (English Colleges, please copy). Of dire necessity, only the doctrines and methods of educators properly so called are dealt with, to wit, the premeditated action which the will of one man has exercised over other men in order to instruct and train them, the problem being to find therein the permanent truths which are the essentials of a definite theory of education, spoken of by Spencer the acute, as constituting the unanimity of the wise. He passes in review the educational practice of the Hindoos, Jews, Chinese, and of the East generally, and shows that much may be learnt from these both of a positive and of a negative kind. He finds much to admire in the Greeks, characterising Plato's 'Republic' as the best treatise on education yet published. Passing on to the Romans he quotes Plutarch, to prove the little value set by them upon the character of the teacher, in which they resembled the English of, say, fifty years ago. 'For if any of their servants be better than the rest, they dispose some of them to follow husbandry, some to navigation, some to merchandise, some to be stewards in their houses, and some, lastly, to put out their money to use for them. But if they find any slave that is a drunkard or a glutton, and unfit for any other business, to him they assign the government of their children. Coming to Quintilian, however, he dwells lovingly upon the wise recommendations of the author of the 'Institutes of Oratory,' who, *inter alia*, said, 'Let study be to your child a play: ask him questions: commend him when he does well: and sometimes let him enjoy the consciousness of his little gains in wisdom.' Other wise words are given, *e.g.*, from Seneca: *Non scholæ sed vitæ discimus*

(Learn not for the sake of the school, but for the purposes of life), and *timeo hominem unius libri* (I fear the man of a single book), which anticipates Pope's diatribic couplet on 'a little learning.' Again, *docendo discimus* (we learn by teaching), which might have come from the lips of Pestalozzi, and yet, again, Plutarch's *longum iter per præcepta breve per exempla* (teaching by precept is a long, teaching by examples is a speedy process), whilst he pins down to Juvenal the oft quoted 'sound mind in a sound body'—*orandum est ut sit mens sana in sano corpore.*

The early Christians and the Middle Ages are next dealt with, and we are reminded that there were really three Renascences, viz., that of the time of Charlemagne, that of the schoolmen, and that of the sixteenth century, which is usually spoken of as *the* Renascence. Under the first heading we are introduced to the Englishman Alcuin, who, we are interested in learning, was the first Minister of Public Instruction in France, and it is deplored that there was, elsewhere than in England, no such fostering of education as was shown by the Saxon King Alfred, who is credited with the aphorisms that 'The English ought always to be free, as free as their own thoughts,' and 'Free-born sons should know how to read and write.' Again, an Englishman—this time Locke—is quoted to prove, with respect to the Middle Ages, what another Englishman—Spencer—has so aptly expressed, that is to say, the subservience of the schoolmen to the authority of Aristotle. 'It seems,' says Locke, 'to see the inertness of the Middle Ages, that God was pleased to make of man a two-footed animal, while leaving to Aristotle the task of making him a thinking being.' There was evidently little chance for reform here. Eloquent tribute of praise is given to Abelard (1079–1142), who taught at Paris, and to whom is assigned all glory and honour for the establishment of the Paris University, which, although not in existence for sixty years after the death of this great man, was, without doubt, a direct outcome of his influence. The curriculum at this period comprised the Seven Liberal Arts subdivided into the Trivium—Grammar, Dialectics and Logic, and Rhetoric—and the Quadrivium—Music, Arithmetic, Geometry, and Astronomy. All these subjects are abstract: teaching from the concrete was unknown.

The 'History' now proceeds to enumerate much the same Reformers as are named by our own Quick, with whose book our readers are presumed to be familiar, and one work will form an admirable sequel to the other. In one respect however, Compayré is alone, viz., in giving emphasis to the reforming influence of women, of whom he notably instances Miss Edgworth, Miss Hamilton, and Mme. Necker. Much attention is, of course, given to Comenius, Montaigne, Rousseau, Pestalozzi, and Froebel, and admirers of Bell and Lancaster will find them treated as the originators of the system of mutual instruction.

The book concludes with a descriptive and critical account of the modern writings upon the science of education, much space being devoted to Spencer and Bain, with whom the writer finds many things in common, and to whom he invariably yields unstinted admiration. Other English writers treated of are the two eminent Americans, Horace Mann and Channing.

But we have come to the length of our tether, and must forbear, although feeling how thoroughly inadequate our sketch has been. Still, we would fain hope that some at least of our readers will see the justice of our belief that English teachers are handicapped in the onset of their career by the supineness and shortsightedness of those who ought to know and to act better: and this was the main purpose we had in view in penning these few lines of appreciation of Gabriel Compayré, to whom a long life and a yet fuller measure of recognition and honour!

CONVERSATIONAL LESSONS IN CHEMISTRY.

BY THOMAS CARTWRIGHT, B.A., B.SC.(LOND.).

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FOR particulars of the List of Chemicals and PRACTICAL TEACHER Set of Apparatus for working the experiments referred to in these lessons see numbers for January and February 1893.

LESSON IX.—*Sulphur.*

Here, Charlie, bite a bit of this sweetstuff. What, don't you like it? It is not sweetstuff, sir, for it has no taste at all, much less a sweet one. Very good, you have told me what it is not; now perhaps some of you are clever enough to tell me what it is. Oh, I see nearly all of you can do that for me. Well, Walter, what is it? A stick of sulphur, sir. Right; and now tell me what the chemical symbol or sign for this body should be. It should be S, should it not, sir? Yes; and now, Arthur, take the specimen again in your hand and tell me all that you can about it from your own observation of it. Do not be hurried, and above all be thoughtful in your inspection. It is a solid, yellow in colour, and, as Charlie said, without taste or smell. I put some in water, which has no effect upon it, so that I shall say it is insoluble in water; and as for fire, we all know that S easily burns with a pale blue flame. I am very pleased with your answer: it shows you are learning the art of using your senses, an art in which very few people indeed are thoroughly proficient. To continue, will you please break off a small piece to burn, Walter? Ah! I see Tom has noticed something, and we must wait to see what it is. Proceed, Master Tom. S is very brittle, sir; it breaks quite easily. Very true. Now for your burning, Walter. Hallo! Frank, what are you putting your fingers to your nose for? It smells so, sir. Well, now, what does it smell like? You answer, Trixie. It smells just like burning matches, and I suppose there is S in matches. Why should there be? Well, sir, you see how easily it burns, and of course we want matches to be easily kindled. Exactly so; I am satisfied with your reason. Now, Bob, what are you so anxious to tell us? There is something else which smells like S, sir, when it is burnt, and it burns more easily than matches. Ah! sir, you have a puzzle for us. I can guess the answer, who else can? Well, Annie, what do you think? Gunpowder, sir. Is that right, Bob? Yes, sir, and I suppose I am right in thinking there is S in gunpowder. Quite right. Now, silence all of you, and listen to the singing of the S. No questions, but be all ears. See, I hold this stick of S in my hand, and now for the music. Did you hear it? I heard something cracking, sir, and there it is again. *That* is our music, Fred. Don't laugh, I will admit that it is not very pretty, but can you explain it? You can't? I must give you a little assistance then. What noise do you sometimes hear when the light of a lamp is suddenly turned up? Just the same noise as your sulphur music, sir. Exactly so, and both are due to the same cause, so that in explaining one you explain the other. But look! the sulphur has broken; does the lamp glass break when you hear the noise?

Go on, Tom. It does, sir, and for this reason—glass does not permit the heat to pass through it very readily, and heat causes bodies to expand, therefore that part of the lamp glass which is heated expands and starts away from the colder parts, and that causes the fracture. Well done, Tom, you must have well understood that lesson on heat, or you could not have remembered it so well. You all see now that our music, although not sweet, is useful, for it teaches us—what, Minnie? That S is a bad conductor of heat. Now, Ernest, here is a bottle which we used in one of our earliest lessons in this subject; can you recollect what it contains? It contains a solution of S, sir. See, here is the label. Yes, but did we not say that S was *in*soluble? We did, sir; but we were then speaking of water, and this is a solution of S in carbon disulphide. Quite true, and that is what I wished to call your attention to, viz., that the universal solvent—as water is called—will *not* dissolve all substances; but still, we can generally find a suitable solvent, as in the case of S, which, although unacted upon by water, readily dissolves in this foul-smelling CS_2, as you here see for yourselves. Now, put a tall, narrow beaker on the sand bath which stands on yonder tripod stand. Fill it up with small lumps of S, and apply a gentle heat to it by means of your Bunsen burner. You notice that it soon melts and forms a yellow or lemon-coloured liquid. Continue the gentle heating for some time, until at last all the S is in a state of liquefaction. Now, set it on one side to cool, and tell me when a crust has formed over the top of the liquid. It is now time to pierce this crust with a piece of red-hot iron wire, after which we invert the beaker over a vessel containing water, into which pours the unsolidified liquid. With a knife proceed to cut off the crust, and behold! a very pretty sight. You note that the S has formed transparent needles—which we call prisms—and these interlace in shooting across from one side of the beaker to the other. There, now, I am sure you will all admit that those needles do not look like ordinary S, so we name this kind of S the prismatic variety. Place the beaker in the cupboard, John, until our next lesson, when we will again examine it, and I do not mind telling you that the crystals will no longer be transparent, but will have become opaque like the stick which we have before us.

The next thing to do is to get a long test tube and to place therein some more S; but beforehand I wish to ask you what happens to a solid when it is heated, in order to prepare you for another surprise. Now, Arthur, we will listen to you. The solid melts and forms a liquid, sir. Very good, but go on! What happens to the liquid? It ought to get thinner and thinner and thinner until at last it is no longer a liquid, sir, but goes off as a gas. Pray go on and tell us what heat does to a gas. It causes it to expand, sir, because the molecules are driven further and further apart. If you all understand thoroughly what Arthur has just now told you, you are ready to appreciate my 'surprise.' Put the test tube near the Bunsen flame. What do you observe, Trixie? The S has liquefied, sir. Right. Now, Arthur, pour the liquid out. Is it anything like treacle? No, sir, it is a thin liquid. Good. Now go through the same stage again, only continue the heating. Ah, sir, the S is becoming black. Very true; and now, Arthur, take the test-tube holder and pour out your sulphur now. It won't pour out, sir; it is too thick. In fact, it *is* like treacle now. Well, continue to raise the temperature, and then try to pour out again. There it goes, sir, I have poured it into the water. Never mind the water now, but invert the tube and go on heating that which remains in it. Well, Frank, what do you observe? It has become a gas at last, sir; for see, the fumes are coming off. True, my boy, and you shall now tell wherein consists the strangeness of which I spoke. Sulphur, sir, instead of melting to form a liquid and then vaporising to form a gas, melts to form a thin liquid which, upon heating, again thickens, and therefore goes a step backwards, and seems to be on the point of solidifying again, but stops short of perfect solidification and then behaves like other bodies and gradually gets thinner and thinner until at length it gasifies. Very nicely expressed; and now we will get Trixie to examine the treacly mass which fell into the water. Here it is. What does it look like, Trixie? It looks just like toffee, and is elastic. But why are you so surprised at its elasticity? Because the stick sulphur was so brittle, sir, and this is just the reverse. Well, Tom? Will this sort of S dissolve in CS_2, sir? No, it will not, as you may see for yourself. What is your question, Arthur? Will the elastic sulphur go back to the ordinary variety, sir, after a time? It will, which of course proves—what? That it is really S under another form, and not a new body altogether. With that remark I entirely agree. Now, please remember that this variety of S is known as plastic S. In our next lesson we shall consider the sources of S, and I will now show you some S which is obtained from Sicily in the native or free state. Here it is, and pray notice that it consists of crystals whose form you cannot well make out. As these crystals, however, are the usual ones in which S occurs, I am sure you would like to see them, and I am glad to be able to gratify your wishes. Bring me the bottle containing the solution S in CS_2. Now pour the least drop of the solution on this slide. The CS_2 being very volatile, evaporates, leaving minute crystals on the slide. Place a cover glass over the crystals and put the slide under the microscope, and you will at once see some of the ordinary or octahedral crystals of S of which this specimen from Sicily consists. Now I will write on the board the few facts concerning S which this lesson is intended to bring out. S is a yellow solid without taste. It is insoluble in water and a bad conductor of heat. It has three forms or allotropic modifications (remember carbon), two being crystalline and one (the plastic variety) non-crystalline or amorphous. Upon heating S behaves peculiarly, for it (1) melts to a thin liquid, (2) *thickens*, (3) gets thin again, and (4) at last gasifies.

SCIENCE NOTES.

A TIDAL CLOCK.—A clock tower has recently been erected by the Chamber of Commerce of Rouen which possesses several interesting features. On three sides may be read the time of day; on the fourth, facing the harbour, the height of the tide is recorded. This is effected by a tide indicator consisting of a float, which, by means of a cord and counterweight hung on a drum, actuates a series of shafts with bevel wheel gearing, and moves a hand or pointer on a clock-like dial, which is marked with the figures necessary to show the level of the tide. The dials, which are of opal glass, are lit up at night, and the clock has an apparatus for distributing the time to other clocks in the city, and also for unifying the time in accordance with the method pursued in Paris.

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CATTLE AND HONEY-DEW.—We have before called attention in these columns to the theory that honey-dew is a secretion of the green fly so troublesome to the gardener. The trees and shrubs round Paris, especially the lime, maple, and sycamore, have suffered severely during the hot dry summer from this pest. Cattle like to eat this shining gummy varnish on account of its sugary taste, but it would appear to be unwholesome in its effects. In the Department of the Dordogne it has been found necessary to interdict the feeding of cattle with leaves covered with honey-dew.

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THE NORTH MAGNETIC POLE.—In the States the subject of the thorough scientific investigation of the North Magnetic Pole is now exciting considerable interest. As a preliminary step, the Secretary of the United States Treasury has requested the President of the National Academy of Sciences to appoint a Committee for the consideration of a practical working scheme for the systematic exploration of this magnetic pole. The observers are to be chosen from the officers of the United States Navy attached to the Coast Survey, who have had the advantage of a special training in magnetic observations. A steam whaler is to be chartered to land the party on the northern part of Repulse Bay, where a permanent station is designed to be established, from which every spring a field party or two will proceed to the work of investigation. It is pleasant to remember in this connection that it is to an Englishman, Captain Ross, that the world owes the first discovery of the North Magnetic Pole.

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A NEW FORAGE PLANT.—A new forage plant has lately been tried experimentally which is of rapid growth, and is said to require very

little care in cultivation. *Polygonum Saghalie*, as its name would lead one to suppose, is an introduction from the island of Saghalien. Within the space of three or four weeks it grows to a height of six feet, and is covered with large leaves on which cattle feed with avidity. A single plant is stated to cover more than a square yard, and its weight of leaves in many cases will exceed eighty pounds.

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THE EFFECT OF CIVILIZATION ON COLOUR-BLINDNESS.—Messrs. Blake and Franklin, of the University of Kansas, have recently been investigating the connection supposed to exist between civilization and colour-blindness. In order to determine how far it exists among savage races, several hundreds of Indians were tested at the Haskel Institute, Lawrence, Kansas. It was found that under one per cent. were colour-blind, as against a proportion of from three to four per cent. in the case of Europeans and Americans. Colour-blindness is chiefly congenital and incurable, but it would seem to be also caused by violent concussions, or by the excessive use of tobacco and alcohol. Women are less subject to this form of imperfect sight than men.

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ELECTRICITY IN FRANCE.—Electricity is making rapid strides in France. The city of Paris has offered a site in the Rue de Stael for sixty years to accommodate the central laboratory of electricity, which was founded with the surplus funds of the International Electrical Exhibition of 1881, and which was at first housed at Greuelle. New buildings are being erected there under the auspices of the Société des Électriciens, and part of the laboratory is already in working order. The celebrated electrician, M. d'Aronval, has been making some interesting experiments in what he terms autoconduction. Tesla and other scientists have shown that the body of the experimenter can be included in the circuit of electric currents of great intensity and high frequency without ill effects on the human body. M. d'Aronval passes a current of 200,000 charges per second through a great spiral of wire surrounding the body, but not touching it, holding his arms the while so as to make a circle with an electric lamp held in both hands. The lamp lights up, but he feels nothing. The current only passes in the wire.

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THE PLANET JUPITER.—Professor Pickering, of the Harvard Astronomical Station, Arequipa, Peru, in the course of some investigations into the constitution of the planet Jupiter, has come to the conclusion that this planet is not self-luminous, and is visible only by reflected sunlight. It is surrounded by a rare atmosphere outside the cloudy envelope which is capable of producing a refraction appreciable at a height of 1,900 miles above the limb of the planet. A faint glow is seen beyond the dark limb for about the space of a minute before the rise of a satellite, as in the case of the rising of our moon. Though the limb is not self-luminous, Professor Pickering believes that its temperature is comparatively high.

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A RUSSIAN VINEYARD.—An interesting experiment in Russia has resulted in the transformation of soil consisting entirely of sand and shells into gardens and vineyards of a really profitable nature. The land bordering the town of Berdiansk, which from its nature must have originally been washed by the Sea of Azof, was granted to peasants and German colonists on the condition that they should plant not less than 120 fruit trees or 2,400 vines per desitine, and use every effort to cultivate the same. Some 1,500 desitines of land are now under vine cultivation, and the present production of wine at Berdiansk amounts to about 300,000 gallons per annum. The chief varieties of vines grown are the Chassla of Beruska, Chaous, Isabella, black and white Muscat, Burgonski, and the Alexandra Muscat. On each desitine of land about 3,000 vines are cultivated, and no manuring is practised. The crushing is at present carried on in a primitive manner, and but small attention is paid to sorting or cleaning. Hitherto no wine has been exported from Berdiansk, Bulgarians and German colonists coming in from the country districts during the early autumn and buying up the greater portion of the vintage. The bulk of the wine obtained is of a light character, but where the superior kinds of grape are properly cleared from the stalks and sun-dried, a good strong wine is obtained which keeps well. No phylloxera or other vine disease has as yet appeared at Berdiansk. In addition to the vintage large quantities of ordinary garden produce are grown.

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LIGHTNING AND ARTIFICIAL RESPIRATION.—Artificial respiration is being advocated by Dr. Assmann and Dr. Boens in the case of persons struck by lightning, when no injury is apparent that is incompatible with life. This method was tried with success in the case of a trumpeter apparently killed by lightning at Berlin in 1891, and Dr. Assmann cites instances of persons struck by lightning and showing no sign of life, who were nevertheless restored to animation by a quarter of an hour's practice of artificial respiration.

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THE ALGERIAN LOCUST.—Some time ago we called attention in these columns to the ravages of the Algerian locust. As large quantities of the eggs of this pest are collected by the natives in order to destroy them, it is proposed to extract the oil yielded by the eggs for industrial purposes. In appearance it resembles honey. It burns well and is found to make a good soap with alkali.

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THE VOWEL SOUNDS AND PHOTOGRAPHY.—A successful attempt has recently been made by Professor Hermann to photograph the vowel sounds by speaking them into a phonograph which slowly reproduces them. The vibrations were recorded by a micro-telephone which had a small mirror in the vibrating drum, a ray of light reflected from the mirror recording the vibrations of the vowel sounds on a travelling band of sensitised paper.

***

THE ELECTROLYTIC SEPARATION OF METALS.—Messrs. Smith and Moyer claim to have discovered a better and more certain method of separating copper and antimony electrolytically than has hitherto been practised. By combining solutions of the two metals in the presence of tartaric acid and ammonia, results were obtained on electrolysis which showed very satisfactory separation. The copper deposited exhibited no sign of antimony, and practically theoretical amounts were found throughout a series of experiments, in the course of which the relative quantities of the two metals were designedly varied in order to render it certain that the method could be relied upon.

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THE VOLATILITY OF GOLD.—The novel form of pyrometer, consisting of a large photographic camera, in which a galvanometer may be placed in different positions according to the range of temperature to be observed, has recently been employed at the Mint by Mr. J. K. Rose in a series of experiments devised to ascertain the amount of gold lost by volatilisation during the melting of the pure metal and its alloys. He has found that while the loss of gold increases with the temperature to which the metal is subjected, a smaller amount is volatilised in an atmosphere of coal gas than in one consisting mainly of carbonic oxide. Metals that are easily volatilised in the pure state, when alloyed with gold cannot be completely driven off by the highest temperature attained in ordinary wind furnaces. Mr. Rose has also succeeded in proving in the course of these experiments that the presence of another metal, even though it be non-volatile, has the property of increasing the volatility of gold. He has ascertained, too, that the passage of a current of air or gas over the surface of the molten metal does not increase the loss so long as its strength is insufficient to agitate the surface.

J. R. G.

QUERY COLUMN.

ARITHMETIC.

J. B.—If I invest in the 3 per cents. at 93, what interest per cent. per annum shall I get for my money, supposing I invest immediately after the payment of the dividend, and that the dividends are payable half-yearly?

Half-yearly income on an investment of £93 = £1½.

Half-yearly income on this dividend

$$= £1\tfrac{1}{2} \times \frac{1}{93}$$

$$= \left(\frac{3}{2} \times \frac{1}{2} \times \frac{1}{93}\right)£$$

$$= \frac{3}{124}\,£.$$

Total yearly income on an investment of £93 = £3 $\frac{3}{31}$.

$$\therefore £93 : £100 :: £3\tfrac{3}{31} : \text{Percentage}$$

$$= \left(\frac{\overset{25}{100}}{1} \times \frac{\overset{125}{375}}{\underset{31}{124}} \times \frac{1}{\underset{31}{93}}\right)£$$

$$= \frac{3125}{961}\,£$$

$$= 3\tfrac{242}{961} \text{ per cent. Ans.}$$

J. Guild.—Two men walk uniformly along a railway in the same direction. A train meets one of them who is walking at the rate of 5 miles an hour, and passes him in 10 seconds. A quarter of an hour after meeting the first man it meets the other man and passes him in 8 seconds. When will the latter overtake the former, the length of the train being 110 yards?

sec. : hour :: yards : Rate of train per hour + Rate of first man per hour.

10 : 1 :: 110 : Rate of train per hour + Rate of first man per hour.

$$= \frac{15}{60} \times \frac{3}{60} \times \frac{110}{1760} \text{ miles} = 22\tfrac{1}{2} \text{ miles.}$$

$\therefore$ Rate of train per hour $= (22\tfrac{1}{2} - 5)$ miles $= 17\tfrac{1}{2}$ miles.

sec. : hour :: yards : Rate of train per hour + Rate of second man per hour.

8 : 1 :: 110 : Rate of train per hour + Rate of second man per hour.

$$= \frac{15}{60} \times \frac{15}{60} \times \frac{110}{1760} \text{ miles} = 28\tfrac{1}{8} \text{ miles.}$$

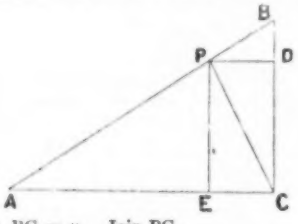
$\therefore$ Rate of second man per hour $= (28\tfrac{1}{8} - 17\tfrac{1}{2})$ miles $= 10\tfrac{5}{8}$ miles.

Distance between the men when the train meets the second man $= \frac{1}{4}$ of $17\tfrac{1}{2}$ miles $+ \frac{1}{4}$ of 5 miles $= \frac{1}{4}$ of $22\tfrac{1}{2}$ miles $= 5\tfrac{5}{8}$ miles.

Distance gained per hour by second man $= (10\tfrac{5}{8} - 5)$ miles $= 5\tfrac{5}{8}$ miles.

$\therefore$ Time when second man will overtake the first $= 1$ hour after the train passes the second man.

Monus.—ABC is a right-angled triangle, of which the hypotenuse AB is 10 ft. long. From a point P in the hypotenuse perpendiculars PD, PE are drawn to the sides BC and AC respectively, and CD = 4 ft., CE = 2 ft. Find BD and AE.



Let AC $= x$, BC $= y$. Join PC.

Then area of APC $= \frac{1}{2}$ AC. PE $= \frac{1}{2}$ AC. CD $= 2x$, also area of BPC $= \frac{1}{2}$ BC. PD $= \frac{1}{2}$ BC. CE $= y$.

$\therefore$ area of ABC $= 2x + y$, but it also $= \frac{1}{2}$ AC. CB $= \frac{1}{2}xy$.

$\therefore 4x + 2y = xy$ (i)

Also by Euclid i. 47 $x^2 + y^2 = 100$ (ii)

From (i) $x = \dfrac{2y}{y-4}$ Substitute in (ii) $\left(\dfrac{2y}{y-4}\right)^2 + y^2 = 100$

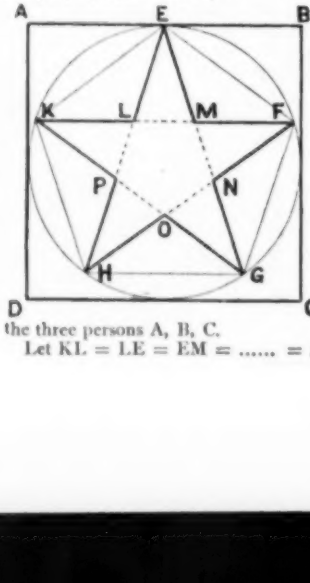
$\therefore y^2(y-4)^2 + 4y^2 = 100(y-4)^2$

$\therefore y^4 - 8y^3 - 80y^2 + 800y - 1600 = 0.$

This is an equation which there is no possibility of solving, we think, except by the general method for biquadratics.

The numerical value of the root may be found by 'Horner's Method,' for which see Theory of Equations. We obtain the value $y = 3{\cdot}2807$ ....., but the work is very tedious. x can now be found.

Monus.—Required to divide a plot of ground between three persons, A, B, C, as follows:—



A circle is inscribed within a square, and a five-pointed star within the circle; A gets the area within the square and outside the circle; B gets the area within the circle and outside the star; C gets the area within the star.

The outline of the star is fenced with boards 16·5 feet long and 6 boards high. There are as many boards in the fence as there are acres in the area of the star. What is the area of the whole and what for each of the three persons A, B, C.

Let KL = LE = EM = ... $= x$.

Join EF, FG, GH, HK, KE. It is clear that these lines form a regular pentagon. Also by Euclid iii. 21. $\angle GKF = \angle GEF$, and hence KEL, LEM, MEF and all corresponding angles in the figure are equal each to one-third of the angle of a regular pentagon, *i.e.*, to 36°. Hence in Δ KEL the angles are 36°, 36° and 108°. Hence KE $= 2x \cos 36°$.

The radius of the circle circumscribing a regular pentagon can be found at once by Trigonometry. The formula is

$$R = \frac{a}{2} \operatorname{cosec} \frac{\pi}{n}$$

In this case $R = \dfrac{2x \cos 36°}{2} \operatorname{cosec} 36° = x \cot 36°$.

The area of the square is clearly 4 R^2, and the area of the circle is πR^2 $\therefore$ the area of the part given to A is $(4 - \pi) R^2$.

The area of the star is area of pentagon minus five times triangle KLE, *i.e.*, $= 5x^2 \cos^2 36° \cot 36° - \frac{5}{2}x^2 \sin 108°$

$= 5x^2 \cot 36°(\cos^2 36° - \sin^2 36°) = 5x^2 \cot 36° \cos 72°$.

But from the data the number of boards in the circumference is $\dfrac{10x}{16\frac{1}{2}} \times 6$, *i.e.* $\dfrac{40x}{11}$, if x be measured in feet. Since there are 43560 square feet in an acre it follows that

$$\frac{5x^2 \cot 36° \cos 72°}{43560} = \text{No. of acres in star} = \frac{40x}{11}$$

$\therefore x = 31680 \tan 36° \sec 72°$.

We have now supplied data for finding all the quantities asked for, but the complete numerical solution would be very tedious since the trigonometrical ratios of 36° and 72° are complicated. We have no room for more.

LEGAL AND CODE QUERIES COLUMN.

RULES.

1. All communications must be addressed 'Legal Editor, PRACTICAL TEACHER, 5, Pilgrim Street, Ludgate Hill, E.C.,' and must be accompanied by our 'coupon,' duly filled up.
2. Replies will be given *only* in this column, except under the conditions named in Rule 3.
3. If any reader desires a reply by post, such can be forwarded by enclosing, in addition to the coupon, a stamped addressed envelope and a shilling Postal Order.
4. No original documents should be forwarded, but copies only. We cannot hold ourselves responsible for any losses which occur through non-observance of this rule.

'A.P.'—You can obtain a copy of the 'Science and Art Directory,' which will give all the information you require, from the Secretary, Science and Art Department, South Kensington, S.W. You should forward stamps to the value of 6d.

'R. COXON.'—Marks for a 'First Advanced' obtained this year, will be given at the Scholarship Examination in 1894.

'GOOD ATTENDANCE.'—The Department will not sanction your proposal, if they follow precedent. It was proposed by a body of Managers to remit, to the extent of one penny per week, the fees of children who had attended full time. The Department objected, as they considered that there was no reason why a child who, in consequence of there being no reasonable excuse for non-attendance, attended school regularly, should be placed in a better position as regards fees than one who had attended less regularly, when there is a reasonable cause for absence.

'LOG BOOK.'—'It is not intended that individual Managers may, on their visits to the school, make

entries in the Log Book, though it would be perfectly reasonable that any resolution arrived at by a majority of the Managers should be entered in the Log Book by the Correspondent or Secretary.' (Letter from Education Department, 1883.) This statement of the intention of the Department must, however, be now qualified, as the Managers are required to notify the fact that they have tested the registers, in the Log Book. This is the only occasion, in my opinion, upon which an individual Manager is justified in making an entry.

'INCOME TAX.'—You cannot deduct the sum from your Annual Income for the purposes of the Income Tax Acts.

'PRIVATE SCHOOL.'—The assistant cannot obtain an injunction to restrain you from dismissing him. His remedy is an action against you for wrongful dismissal. I should strongly advise you, under the circumstances, to pay him one month's salary in lieu of notice, and send him off at once. The adoption of this course will render any action he may bring unsuccessful.

'W.M.'—You cannot recover from the executors more than the amount due for services actually rendered.

'F.L.'—There are 61 County-Boroughs, named in Schedule 3 of the Local Government Act of 1888, which, either being counties of themselves or containing a population of not less than 50,000 inhabitants, are constituted administrative counties of themselves. The list is too long to give here. You can obtain a copy of the Act from Messrs. Eyre and Spottiswoode, East Harding Street, E.C.

'W.F.'—You cannot *commence* an action for slander in the County Court; but the action at a certain stage may be remitted, under certain conditions, to the County Court by a Judge of the High Court. You should consult a good solicitor at once.

'J.F.'—Certainly not.

'G.M.'—Yes, it is quite true that there are exceptions to the general rule. As you state, where there is no will, all freehold lands and tenements go to the *eldest* son. This is the rule. The exception to which you refer is the custom of 'Borough English,' which still prevails in certain districts. By it, the lands to which you refer are now the property of the *youngest* son, if there has been no breach of the custom in connection with that particular land.

'COUNTY COUNCIL.'—Yes, you have a right to be placed in Division I., which entitles you to vote in County Council as well as Parliamentary elections. The whole question hinges upon whether or not you are compelled to live in your house as a condition of service. I cannot give the authorities here, but advise you to consult the Registration Agent of the political party to which you belong.

'SCHOLARSHIP' and 'PUPIL TEACHER.'—I have answered this question in this column before, but will repeat it as it appears to be of wide interest. Marks are given at the Scholarship Examination for those 'Sciences' which are obtained within the fourteen months immediately preceding the date of the examination, and for 'Drawings' which are obtained at *any time* preceding the examination.

'M.C.'—You have a legal claim for the salary. It is not necessary to employ a solicitor to take out a County Court Summons, but if an action ensue, you should instruct one. The treasurer of the school is the proper person to sue.

'CHEATED.'—As you are labouring under a by no means uncommon mistake I answer fully. It is not necessary in order to successfully maintain an action for breach of contract, that the terms of the agreement should be stated in writing. 'Writing' does not make a contract except in the case of a deed, it is merely evidence of the terms of the contract. There may not have passed a letter between yourself and the rector, there may be no minute of your appointment, there may be no formal memorandum of agreement, and yet it may be possible to prove the terms of the agreement. You do not give me enough particulars to enable me to advise definitely on this point, but I want you to clearly understand that written evidence is not a *sine quâ non*.

'W.R.S.'—Although your pupil is an infant you can compel him to pay the fees. 'It has always been held that an infant may bind himself by contract for the supply to him not merely of the necessaries of life, but of such things as are suitable to his station in life, and to his particular circumstances at the time.' It is certainly 'suitable to his particular circumstances' that he supply himself with such tuition as he may consider necessary to pass the Scholarship Examination.

'T.M.'—You can recover £12 10s.

'F.R.'—Without perusing exact copies of the letters which have passed between you I hesitate to advise.

I have to acknowledge the receipt of either Postal Orders or stamps to the value of one shilling from T.W.', 'L.R.', 'Mona,' 'Rex,' and 'M.W.', to whom replies have been forwarded by post.

NOTES AND NOTIONS.

BY RICHARD WADDINGTON,

Ex-President of the Half-Time Council of Teachers.

THE Science and Art Department is fearfully and wonderfully constituted. Nearly two years ago the mandate was issued that payment on second classes in the elementary stage would cease with last year, and at the same time it was announced the Department would hold the power to impose a fine of half-a-crown for each paper that did not gain 25 per cent. of the possible marks. Whatever may have been the educational vagaries of the former arrangement, the results so far to hand are simply staggering in their poverty. Financial valetudinarianism will result in the stifling of many of the classes where the artisan is the student.

* * * * *

THE more robust Higher Grade Schools have already, in some measure, insured themselves by becoming Organized Science Schools, but the small suburban Science Class, which caters for the worker, will find its finances crippled. Let me give one illustration: A teacher has taught a class of artisans for a whole winter. The fees are nominal, and the grant earned this year is represented by a debt to

the Department; and, as usual, the loss falls mainly on the teacher, who is paid by 'results.'

'A "strange coincidence," to use a phrase
By which such things are settled now-a-days.'

* * * * *

A Local Board in Cheshire advertised for a town pavior. One of the applicants stated that he had been for eighteen years in the employment of the Manchester Corporation in the 'art of highway construction.' After setting out fully his powers to 'mix cement, range and set out sewers,' he stated that he understood 'vulgar decimals, square and cube solid measure,' and concluded with 'length of time in present situation, eighteen years, two months, one week, three days. Time lost through illness or own fault, three quarter-days. Cause, sleeping too long in the morning.'

* * * * *

Mr. Kekewich says he would rather see a child out of school than subjected to danger from his daily environment, and he is not sure whether we have any right to compel children to attend schools that are insanitary. There can be no doubt that many of our primary schools are far from perfect from the sanitary aspect, and I am glad to see Mr. Kekewich is bent on pursuing a policy of progress; but if the Secretary to the Education Department is so bent on proper sanitation for the schools, why not for the teachers? Many of the school-houses belie description. Only the other week the *Lancet* described the water supplied to the school-house at Arlington as unfit for human consumption. Yet the Department allowed the teachers to be dismissed for taking the only course open to save their lives. I have not heard that the Department has declared the Board 'in default' for this wanton parsimony in dealing with the supply of one of the necessaries of life.

* * * * *

The 'sportive spirit' is as strongly marked as the local dialects in the North of England. A teacher about to give out the hymn before dismissal noticed two boys engaged in conversation. Inquiry as to the subject under discussion elicited the fact that one boy offered to bet the other two marbles to one that the hymn would be 'Jesus, tender Shepherd.'

* * * * *

Mr. Acland's first budget speech is full of deep educational interest. The approbation and attention of the House was secured. Among the suggestions thrown out, the peripatetic rural organiser is the most impractical. Now, there are some parts of the curriculum in which a peripatetic teacher might be of use to the rurals. Drawing, needlework, cookery, laundry work, and manual instruction as the term is now applied to working in wood and iron, would all lend themselves to this treatment. But of organisers at present there are more than enough. The rurals want 'fodder,' not physic. What Mr. Acland wants to do is to secure more teaching power and better apparatus. The visit of the well-paid peripatetic organiser, if it results in pleasant advice only, will be of little avail to the rural struggling single-handed with seven standards and the infants. At present, the rural gets plenty of advice—he wants some workers. Better than the peripatetic would be a special grant of sufficient proportion to secure that in every school where the average is below 60 there shall be a second certificated teacher. The rural doesn't want advisers who lay the law down in kid gloves, so much as some 'coat doffers' who are prepared to share the heat and burden of the day.

* * * * *

In the Blue Book just issued Mr. Rooper, the Inspector for the Bradford District, makes a suggestion anent the P.T.'s which was made in these columns last year when he says:—'It would further simplify the work of the collective instruction if certain subjects like history and geography could be so divided that the students in two different years of their apprenticeship could be examined in the same section of the subject. The ground covered might be the same in the end.'

Not only has the suggestion been ventilated here but it was agreed to by the Liverpool Conference. I am pleased to see at least one inspector sees the great advantage of such a scheme to districts where the centre system is impossible.

* * * * *

On the question of an Age and Attendance Qualification for exemption from school, Mr. Bernays, of the Durham District, says:—'I feel more and more convinced that the only effectual remedy is to be found in the abolition of the certificate of proficiency, and the substitution of one for "due attendance," at, of course, a much higher figure than at present, without which no child should be allowed to leave school or obtain employment.' Mr. Monro, H.M.I., Swansea District, says:—'The labour standard, I am glad to say, has in a few instances been raised, although many educationalists hope to see the time when it will be altogether dispensed with, and an age clause, accompanied by a minimum limit of previous attendance at schools, substituted.'

Mr. Brodie says, 'He (Mr. Codd) would like to see an attendance and age qualification as condition of employment instead of standard exemption.' Mr. Fowler, H.M.I., Stoke-on-Trent District, says, 'It (the standard for exemption) is apt, moreover, to complicate and interfere with the existing arrangement of examination by sample, and would be well replaced by a system of granting certificates based on attendance, age, and satisfactory conduct, allowing of course for exceptions in extreme cases.'

Mr. Parez, Chief Inspector for the North Central Division of England, says, 'But on other grounds, of more importance, at any rate, as affecting the children, I cordially endorse the proposal which has been made in last year's Blue Book's reports, and which several of my colleagues also urge, that age and attendance should be the child's only title to release from continuing at school.' And says Mr. Synge, 'As long, however, as the labour certificate depends on passing in all subjects in a standard, some school authorities will require every child to be examined.'

* * * * *

The following synopsis will be found of value. It gives the state of the law on Child Labour in England, France, Germany, and Switzerland, bringing out the fact that Great Britain is a long way behind the Berlin Pledge of 1890. The thick vertical lines represent the Berlin standard, and the parts printed in italics are below that standard:—

SYNOPSIS OF THE LAW AFFECTING CHILD LABOUR IN GREAT BRITAIN, FRANCE, SWITZERLAND, AND GERMANY.

COUNTRY.	ACT.	Under 10.	10 to 11.	11 to 12.	12 to 13.	13 to 14.	Over 14.
GREAT BRITAIN.	EDUCATION ACTS, 33 & 34 Vict. c. 75, 39 & 40 ,, c. 79, 43 & 44 ,, c. 23	*Employment prohibited.*	*Half-time employment allowed on passing half-time (By-law) standard. Full time employment allowed on passing full time (By-law) standard.*		Same as from 10 to 12.	Employment full time or half-time allowed if Standard IV. has been passed or if certificate of due attendance obtained.	Totally exempt from obligation to attend School.
	FACTORIES AND WORKSHOPS ACTS, 41 Vict. c. 16, 54 & 55 Vict. c. 75	*Employment prohibited.*	*Employment prohibited.*	*Half-time employment allowed if half-time (By-law) standard has been passed, and if children are actually attending school half-time for specified hours. Full time employment prohibited.*	Same as from 11 to 12.	Half-time employment allowed without educational test if children are actually attending school half-time for specified hours. Full time as under Education Act.	As above.
	COAL MINES ACT, 50 & 51 Vict. c. 58.	*Employment prohibited.*	*Employment prohibited.*		*Employment of girls below ground prohibited. Employment of boys below ground and of girls above ground as under Education Act, except that hours of employment above ground are regulated so as to prevent employment beyond half-time.*	*Employment of girls below ground prohibited, otherwise as under Education Act.*	As above.
	METALLIFEROUS MINES, 35 & 36 Vict. c. 27.	*Employment prohibited.*	*Employment prohibited.*	*Employment below ground prohibited: above ground as in factory.*	*Employment of girls below ground prohibited; of boys as under Education Act. Employment above ground as under Factory Act.*	*Employment of girls below ground prohibited; of boys as under Education Act. Employment above ground as in factory.*	As above.
	PREVENTION OF CRUELTY TO, AND PROTECTION OF, CHILDREN ACT, 52 & 53 Vict., c. 44.	*Employment prohibited.*	*Prohibited between 10 p.m. and 5 a.m., with power to Local Authority to extend these hours by By-laws (in addition to regulations) as under Education Act.*		Same as from 10 to 12.		As above.
SWITZERLAND.	FACTORY ACT.	*Employment prohibited.*	*Employment prohibited.*		Employment prohibited.	Between 13 and 16 many of the Cantons provide for partial employment. The total exemption age in Geneva is 15; Zurich, 16; Neuchatel, 16; Berne, 15.	
GERMANY.	FACTORY ACT.	*Employment prohibited.*	*Employment prohibited.*		Employment prohibited.	Can only be employed for six hours a day.	May work full time.
FRANCE.	FACTORY ACT.	*Employment prohibited.*	*Employment prohibited.*		Employment on production of Certificate of educational proficiency.	May work full time.	

Mr. T. P. Sykes tells the following story of the visit of a parent to school: 'She had evidently come with a purpose in view. "How is our John getting on?" "Oh, pretty well. He is rather inclined to be careless." "Will he pass?" "I can't say; he is not one of the sharpest at his lessons." "Well, if he doesn't get on and pass yo mun whezzle his canister."' 'Whezzle his canister' must be truly Bradfordian, for I cannot discover it in any Yorkshire dialect at hand. I suppose it is a Yorkshire translation of 'Spare the rod and spoil the child.'

* * * * *

The late Home Secretary issued a minute under the Factory and Workshop Act fixing the standard for full time employment at the fourth or such higher standard as the local bye-laws provided for total exemption. Pressure from the industrial centres resulted in the suspension of this minute for twelve months. And now Mr. Asquith has issued a new minute, to come in force next September, fixing standard five as the universal standard. The result will be that a child who has not passed the fifth standard or made 250 attendances for each of five years since the fifth birthday will not be qualified for employment in a factory or workshop; but if the child has passed the fourth standard the child will be freed from school attendance. Surely it is high time some attempt to unify and simplify the existing regulations affecting school exemption was made.

SPECIMEN MUSIC TESTS FOR PUPIL TEACHERS AND SCHOOLS.

BY W. G. McNAUGHT, A.R.A.M.

School Division IV.—Standard V. and upwards.

Combined Time and Tune.

In studying combined time and tune it is not advisable to first sing through the tune regardless of the time and then later on hope to add the time. If the two points must be separated, it is better at first to monotone the time. But exercises which vary the rhythm of the same tonal successions are excellent studies. The following are specimens. Innumerable variations can be made by any intelligent teacher.

Tonic Solfa.

Varied rhythms with the same tonal successions.

(1) Doh = D.

(*a*) | d:—\|s:— | m:r \| d:d' | s : l \| s :f | m: r \| d:— ||

(*b*) | d:—\|—: s | m: r \| d :d' | s :— \| l :s.f | m: r \| d:— ||

(*c*) | d:s \|m: r | d:—\| d':— | s.l:s.f\| m :r | d:—\|—:— ||

(*d*) | d:—\|s:m.r | d: d'\| s :— | d :— \| s :f.m | r:—\| d:— ||

(*e*) | d: s \|m: — | r:—\| d :d' | s :l.s\| f :m | r:—\| d:— ||

(*f*) | d: \| : s | m: r \| d : | d':s.l\| s :f | m: r \| d:— ||

(*g*) | d: s\| :m.r | d: \| d': | s :-.l\| s : | f :m.r\| d:— ||

(*h*) | d: \| : | s :m.r\| d :— | d': \|s.l:s.f | m: r \| d:— ||

(2) Doh = F.

(*a*) | m :— :s | d :r :m | f :s :l | s :t, :d ||

(*b*) | m :s :d | r :— :m | f :— :s | l :s.t, :d ||

(*c*) | m :-.s :d.r | m :— :f | s :-.l :s.t, | d :— :— ||

(*d*) | m :— :— | s :d.r :m | f :-.s :l | s :t, :d ||

(*e*) | m : : | s : :d | r :-.m :f.s | l :s.t, :d ||

(*f*) | m :s : | d.r :m :f | s :l : | s.t, :d : ||

(*g*) | m :— :— | s :— :— | d.r :m.f :s.l | s :t, :d ||

(*h*) | m :-.s :d | r :-.m :f | s :-.l :s | t, :d :— ||

Studies in Changes of Key.

The formation of exercises in transitions or changes of key calls for special knowledge. To the uninitiated it may appear that the passages ((*a*) and (*b*)) below present practically the same difficulty, inasmuch as in each case one note of a scale is to be turned into some other note of another scale:

(*a*) d m l r ˢs, l, t, d

(*b*) d s m ᵗ,d m s r d

but as a matter of fact the second passage is much more difficult than the first. For all ordinary purposes (including all the Education Department, School, Pupil Teacher, and Training College examinations) the study of *one remove* transitions is sufficient. Tonic solfa text-books explain all that is meant by *one remove*. It will be enough to say here that passages that can be pointed from one column to the next on the right or left on the modulator, exemplify this change. Again, as the key always changes a fourth or a fifth higher or lower in *one remove*, it follows that if a *bridge note* is at either of these intervals from the note it becomes the change indicated must be a *one remove*.

But even *one remove* changes can be difficult or easy according to circumstances. It is for this reason that educational exercises are very necessary in studying transitions. It does not do to merely learn songs and pieces that change key, because in many, if not most cases, the changes are not read, but the effect is picked up without any conscious association of this effect with the notation.

One remove changes are easy (1) when the bridge has occurred as the previous note, (2) when the change is made to the *doh* or *soh* of the new key, (3) when there is only stepwise movement just after the change, (4) when the time is slow immediately after the change.

Example (1.) t.

| d :—\| m :— \| r :—\|ˢs, :— \| l, :—\| t, :— \| d :—\|—:— ||

f.

|ᵈs :—\| f :m \| r :—\| d :r \| m :—\| r :— \| d :—\|—:— ||

Conversely, one remove changes are difficult (1) when a leap is made to the bridge, (2) when the change is not on some sound of the new key chord (*doh me soh*), (3) when there are leaps just after the change, (4) when the time is quick immediately after the change.

Example (2.) t. f.

| d :— | m :s | $^{d}f_{1}:t_{1}.r$ | s_{1} :m | ^{1}m.f: l.r | s.t_{1} :d ‖

These considerations of course all apply, whether the exercises to be studied are in combined time and tune, or whether they are timeless; but they have much stronger force in the study of combined time and tune.

Easy Studies in Transition.

(3) Doh = E♭. B♭. t.

| m :r | d :d' | t :l | s :— | ^{s}d: t_{1} | d :r | r :d.t_{1} | d:— }

f. E♭.

| d :d | r :r | m :r | r :d | ^{d}s:f | m :s.f | m :r | d:— ‖

(4) Doh = D. f. G.

| s :d | t_{1}: d | m :s | f :— | ^{r}d:m | s :f | m :— | r:— }

D. t.

| ^{r}s:l | t :d' | s :f | m :s | d :r.m | f :t_{1} | r :— | d:— ‖

(5) Doh = D. A. t.

| d :s | m :s | d :— | m :— | $^{m}l_{1}$: t_{1} | d :r | m :-.r | d :— }

f. D.

| ^{d}s:l | s :f | f :— | m :r | s :d.r | m :r | r :— | d:— ‖

(6) Doh = C. f. F.

| m :— | d :m | s :— | d' :— | $^{d'}$s:— | s :f | m :r | d:m }

C. t.

| ^{m}l:— | t :d' | s :f | m :s | d :— | r :m | r :— | d:— ‖

Moderately Easy.

(7) Doh = E♭. B♭. t.

| d :s | f :m | l:— | ^{s}d :— | t_{1} :r | s_{1} :d | l_{1} : t_{1} | d:— }

f. E♭.

| ^{d}s:l | f :m | r :l | d :r | m :f.s | f :m | r :— | d :— ‖

(8) Doh = D. A. t.

| m :s | d :r.m | f :— | ^{1}r :— | t_{1} :d | s_{1} : l_{1} | t_{1} :r | d:— }

f. D.

| ^{r}l: s | f :m | d' :— | s :m | f :— | m :r | d :— | — :— ‖

(9) Doh = E♭. B♭. t.

| s :f | m :s | d :— | ^{d}f:— | m :r.d | t_{1} :r | d : l_{1} | s_{1}:— }

f. E♭.

| l_{1} :t.d | r : s_{1} | f :— | m :r | ^{d}s:— | f :m | f : t_{1} | d :— ‖

(10) Doh = C. F. f.

| d :m | s :d' | f :— | m :— | ^{f}d:— | r :f | m : s | f :m }

C. t.

| ^{r}s:— | l :t | d' :m | m :r | l :— | t_{1} :— | d :— | — :— ‖

More Difficult.

(11) Doh = D. A. t.

| d :m :d | ^{1}r :-. t_{1} :d | s_{1} :f :m | r : l_{1}. t_{1} :d }

f. D.

| ^{s}r:f :m | r : t_{1} :d | m :— :r | d :— :— ‖

(12) Doh = E♭. B♭. t.

| s :f.m :r.d | ^{d}f: t_{1} :— | d :r :m | l_{1} : t_{1} :d }

f. E♭.

| ^{r}l :f :s | m :r.d :f.m | r :s :t_{1} | d :— :— ‖

(13) Doh = C. G. t.

| m :— | f :r | s :f | m :— | ^{t}m :— | t_{1} :r | d : l_{1} | s_{1} :— }

f. C.

| ^{1}m:s | f :r | d :d' | t :l | s :m.d | f :m | r :— | d:— ‖

(14) Doh = D. f. G.

| d :r | m : f | s :— | t_{1} :— | d :m | ^{s}r:f | f :m | m:— }

D. t.

| ^{1}r:m | f :l | l :s | s :f | f :m.r | m :d | r :— | d:— ‖

Staff Notation Tests.

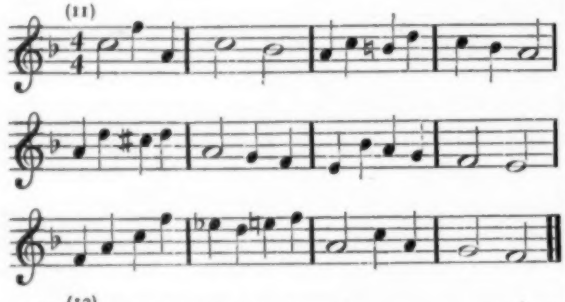
(8)

(9)

Melodies with the Sharp 4th and Flat 7th and Modulations to the Minor.

(10)

(11)



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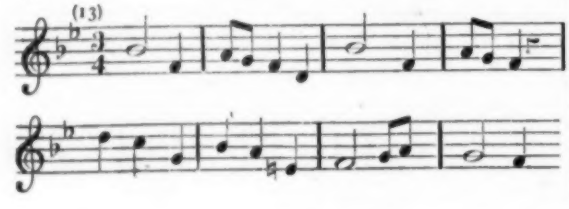

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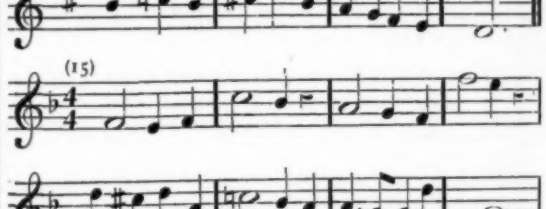
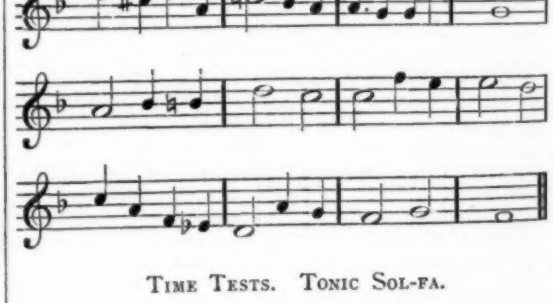
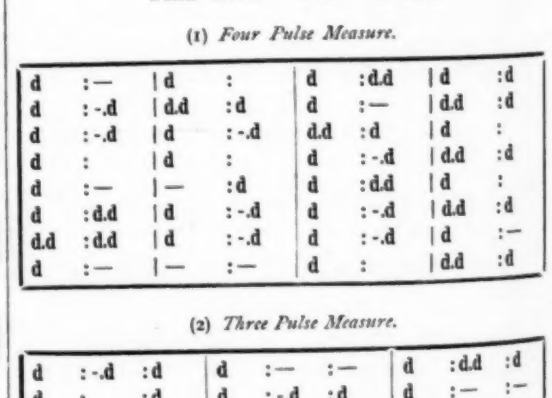
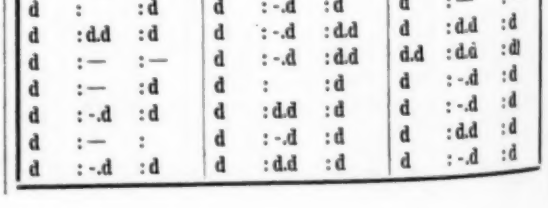
(15)









Time Tests. Tonic Sol-fa.

(1) *Four Pulse Measure.*

d	:—	| d	:	d	:d.d	| d	:d
d	:-.d	| d.d	:d	d	:—	| d.d	:d
d	:-.d	| d	:-.d	d.d	:d	| d	:
d	:	| d	:	d	:-.d	| d.d	:d
d	:—	| —	:d	d	:d.d	| d	:
d	:d.d	| d	:-.d	d	:-.d	| d.d	:d
d.d	:d.d	| d	:-.d	d	:-.d	| d	:—
d	:—	| —	:—	d	:	| d.d	:d

(2) *Three Pulse Measure.*

d	:-.d	:d	d	:—	:—	d	:d.d	:d
d	:	:d	d	:-.d	:d	d	:—	:—
d	:d.d	:d	d	:-.d	:d.d	d	:d.d	:d
d	:—	:—	d	:-.d	:d.d	d.d	:d.d	:d
d	:—	:d	d	:	:d	d	:-.d	:d
d	:-.d	:d	d	:d.d	:d	d	:-.d	:d
d	:—	:	d	:-.d	:d	d	:d.d	:d
d	:-.d	:d	d	:d.d	:d	d	:-.d	:d

(3) *Six Pulse Measure.*
Counting Twice.

1			2			1			2		
d	:—	:—	| d	:—	:—	d	:d	:d	| d	:—	:—
d	:—	:d	| d	:—	:d	d	:d	:d	| d	:—	:—
d	:—	:—	| —	:—	:—	d	:—	:d	| d	:—	:—
d	:—	:d	| d	:d	:d	d	:—	:d	| d	:—	:—
d	:d	:d	| d	:—	:d	d	:—	:d	| d	:—	:—
d	:—	:d	| d	:—	:d	d	:—	:d	| d	:—	:—
d	:—	:—	|	:	:	d	:—	:d	| d	:—	:—
d	:—	:—	| d	:—	:—	d	:d	:d	| d	:—	:—

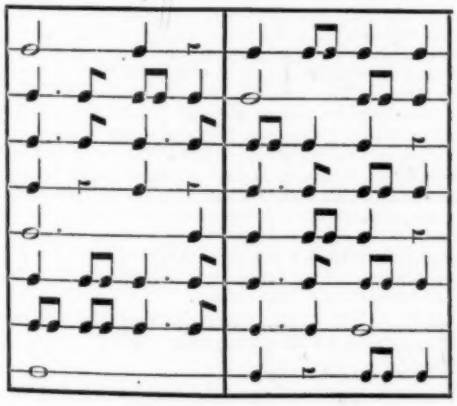
(4) *Four Pulse Measure.*

The division :d., d || is beyond the Code requirements, but it is a very necessary study.

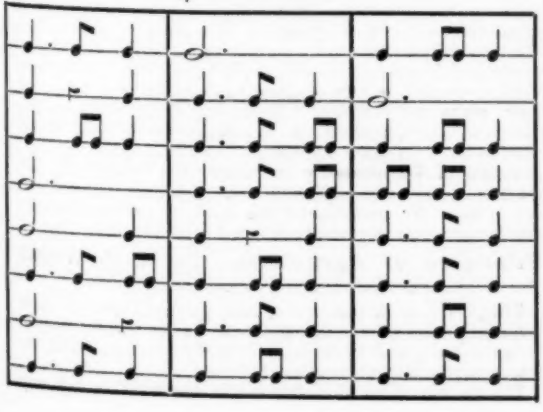
d	:d	| d.,d	:d	d	: -.d	| d.d	:d
d	:d.,d	| d	:d	d	:d.,d	| d.d	:d
d	: -.d	| d.d	:d	d.,d	:d.,d	| d.d	:d
d	:d	| d	: -.d	d	:d.,d	| d	: —
d	:	| d	:	d.,d	:d	| d.d	:d
d.,d	:d	| d.d	:d	d	:d.,d	| d.,d	:d
d	:—	| d.,d	:d	d.,d	:d.d	| d.d	:d
d	:—	| —	:d.d	d	:d.,d	| d.d	:d

Staff Notation.

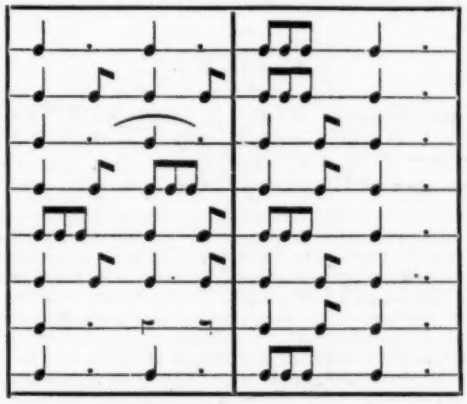
(1) $\frac{4}{4}$ *or Common Time.*



(2) $\frac{3}{4}$ *or Triple Time.*

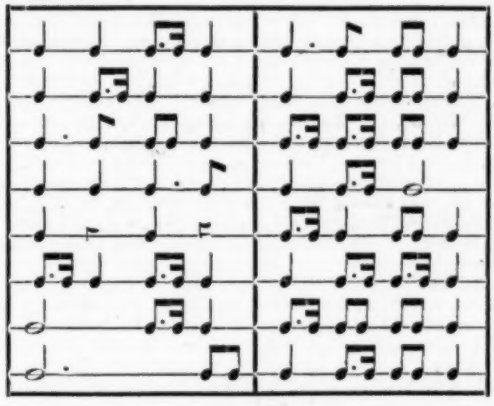


(3) $\frac{6}{8}$ *or Compound Triple Time,*
Counting twice in a bar.



(4) $\frac{4}{4}$ *or Common Time.*

The division is beyond the Code requirements, but it is a very necessary study.



CIRCULAR TO H.M. INSPECTORS.

School Districts Without Efficient Schools.

Education Department, Whitehall, London, S.W.
18th August, 1893.

Sir,—

At the time of the enquiry into School provision throughout the Country, which was made after the passing of the Elementary Education Act of 1870, certain Schools not under Government inspection were passed as giving efficient elementary education. Some few of these Schools have not yet become either 'Public Elementary Schools,' or even 'Certified Efficient Schools.'

When you find a School District which is either wholly or partially dependent on such a School for its School Supply, I am to request that you will propose to the Managers that they should allow you to inspect it, and that you will report the result of your inspection to the Department.

If the Managers refuse to permit inspection, or if your report is unsatisfactory, either as regards the premises or the instruction, my Lords will no longer take the School into consideration among the Schools giving efficient elementary education to the district, and will take steps under the Statute for supplying any deficiency which may be proved to exist.

Where your report on any such School is favourable, arrangements should, if possible, be made for its annual inspection, either as a Public Elementary School in receipt of Grant, or as a Certified Efficient School.

There are some School Districts which have no schools of their own, and are entirely dependent for School Supply on adjoining districts. In all such cases you should satisfy yourself that the School is within a reasonable distance of the population for which

it is supposed to be available, and if you are of opinion that it is not, you should make a special report to the Department.

I have the honour to be, sir, your obedient servant,

To H.M. Inspector of Schools. G. W. KEKEWICH.

REVIEWS.

Juvenal Satires, VIII., X., and XIII. Edited by A. H. Allcroft, M.A., and A. F. Burnet, M.A. (Univ. Corr. Coll. Series). London and Cambridge: W. B. Clive and Co.

The editions of the classics published in rapid succession by the University Correspondence College, adhere very strictly and properly perhaps to their special aim of providing the quantum of information required of candidates for the examinations of the London University. The conditions under which they are produced forbid us to expect a great display of original research and scholarship; the editors, no doubt, feel themselves bound to consult closely the needs of the students for whom they write, of which one of the first is economy of time and labour. Limitations of this kind are by no means free from attendant disadvantages. A commentary from which all but the absolutely indispensable is rigorously excised is very likely to be dull, and dulness is the chief fault we have to find with this edition of the three satires of Juvenal, a fault perhaps the more patent by contrast with the animation and fire of the author. The notes are clear, terse, and fairly adequate; in some cases we think compression has been pushed too far; and with some we are not altogether ready to agree. Thus in VIII., 85, *perit* is said to be a perfect tense, 'is dead already'; but the present is more forcible, *i.e.*, 'his life is a living death.' On the other hand, in X., 118, where the word occurs again, and this time is no doubt a perfect, there is no remark made upon it. In VIII., 49, the antithesis between *togata* and the *armis industrius* (V., 52) should have been pointed out, as in X., 192, the distinction between *cutis*, human skin; and *pellis*, the hide of an animal. In the Introduction, the editors have probably followed their author too implicitly in their description of Roman society of the 1st century, A.D. It is not easy to say how much allowance should be made for the necessity laid on a satirist to exaggerate; but harder to believe that a society so wholly rotten should not have fallen to pieces long before the historical date of its dissolution. The note on Metre and Prosody is not valuable: it gives no account of Juvenal's variations from orthodox Augustan prosody; *e.g.*, the frequent shortening of final *o*, and the rule that 'a vowel is long before two consonants, *x* or *z*, whether in the same word or different words' is hardly an accurate statement of facts.

Horace Odes, Book III. Edited by A. H. Allcroft, M.A., and B. J. Hayes, M.A. (Univ. Corr. Coll. Series). London and Cambridge: W. B. Clive and Co.

This is, in our judgment, the best edited book of this series which we have seen. The text generally contains the results of recent criticism: possibly in one or two cases the editors might have exercised a justifiable discretion in transferring from the text to the notes, at least provisionally, readings which can hardly be said to have as yet established an undoubted claim to acceptance. Take the fourth line of Ode 24 for example, where if *publicum* is accepted as a substitute for the older *Apulicum* with its doubtful quantity, it should at least have been accompanied by a note of interpretation. The commentary generally is a careful and successful piece of work, the notes being short, lucid, and sufficient. In the discussion of passages on which scholars are at variance, the alternative explanations are usually given, and some hint given of the arguments *pro* and *con* on each side. The well-known *crux* in Ode 23, on the construction of the line *Non sumptuosa blandior hostia*, is a good instance, though the objection taken to construing *hostia* as a nominative, on the ground that it involves the awkwardness of two adjectives applied to one substantive, does not seem to have much weight, for *blandior* contains the real predicate.

The Avon Practical Arithmetics. Standards I. and II., III. and IV., V., VI., VII. London: Isaac Pitman and Sons.

This is a series of five little hand-books for the Standards. Each includes a well-graduated assortment of exercises, with short explanations. The printing is remarkably clear, and this is a great merit in class-books of arithmetic.

Text Book of Magnetism and Electricity. By R. Wallace Stewart, B.Sc. (Lond.). London and Cambridge: W. B. Clive and Co., University Correspondence College Press.

This excellent text book is one of the latest publications of the U.C.C. Press, and it is one of the best. It belongs to the 'Tutorial Series,' and is intended to cover the Syllabus for Matriculation, Inter-Science and Preliminary Scientific Exams. For this purpose it is eminently suited, and we envy the modern candidate the possession of such an excellent aid, especially when we contrast with this book those on which we had, perforce, to rely when going through the mill. The sections on Ohm's Law and Terrestial Magnetism are especially well done, and the various sections on 'calculations' will be very valuable. The book has our hearty commendation.

Elementary Mechanics. Stage II. By J. C. Horobin. London: Bell and Sons.

In this little work of 102 pages we have a well-considered course, embracing the foundation principles underlying all science. Only those who have had some experience in teaching the subject can appreciate the difficulties in the way of pupils, and the marked ability with which those difficulties are met by Mr. Horobin.

The author has very properly not confined himself to the department syllabus, but has included enough of the doctrine of energy to give the pupil a clear view of what is the foundation doctrine of all scientific knowledge—the conservation of energy. Many of his experiments are new in their form to text-books, and all are thoughtfully worked out. We congratulate him on reviving the memory of Galileo's experiment on falling bodies in Chapter XI.; but why does he give space to the consideration of Atwood's Machine, and omit to describe the simple form of it mentioned by Prince Kropotkin in the '*Nineteenth Century*' some years ago?

The book is divided into fourteen chapters, each of which is followed by a summary and an excellent set of questions. We recommend this book not only for the specific subject it is drawn up for, but to teachers who are taking up Course A in Schedule II., and to anyone who wishes to put an interesting book into the hands of a clever boy with a bent towards science. The paper is good, the type clear, and there are seventy-two illustrations.

University Cor. Coll. Tutorial Series. Worked Examples in Mechanics. By J. H. Dibb, B.Sc. London: Clive and Co.

This book is designed for those who are 'going in' for matriculation, and will be useful for the South Kensington Examinations in Mechanics. As far as we have examined the solutions we find them accurate, clear, and likely to be of great help to the private student. On some points questions are very fully considered, *e.g.*, the use of sails, rudder, and centreboard to a sailing ship. We take it that the state of things assumed in the diagram to Question 109 could not take place in practice. However, London University Matriculation questions in calculation have been of old famous for a sublime disregard of ordinary facts. A short synopsis of Trigonometry is added; the hydrostatics and pneumatics are especially well worked out, and all formulæ are given. We recommend the book to private students, and for purposes of revision before the examination.

Principles of Agriculture. By R. P. Wright, F.H.A.S. London: Blackie and Son.

This little work consists of four parts. Three of them were originally written as handbooks for the specific subject of agriculture, and have been carefully revised, while the fourth is specially written for this book.

We do not think that this origin has been in any way

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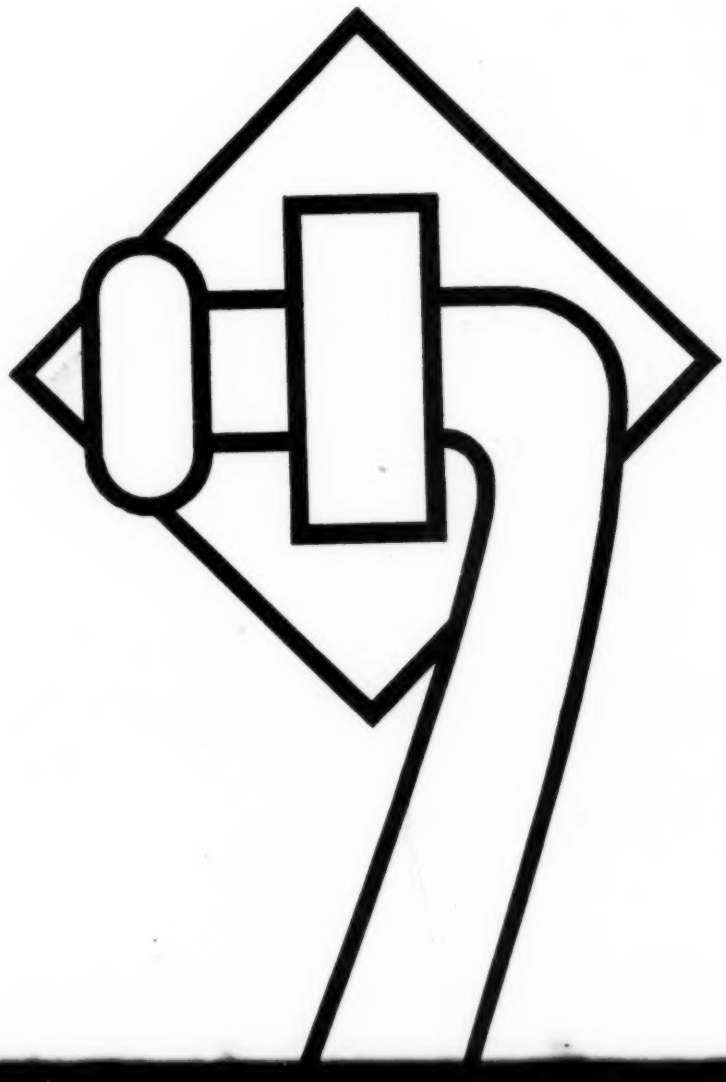

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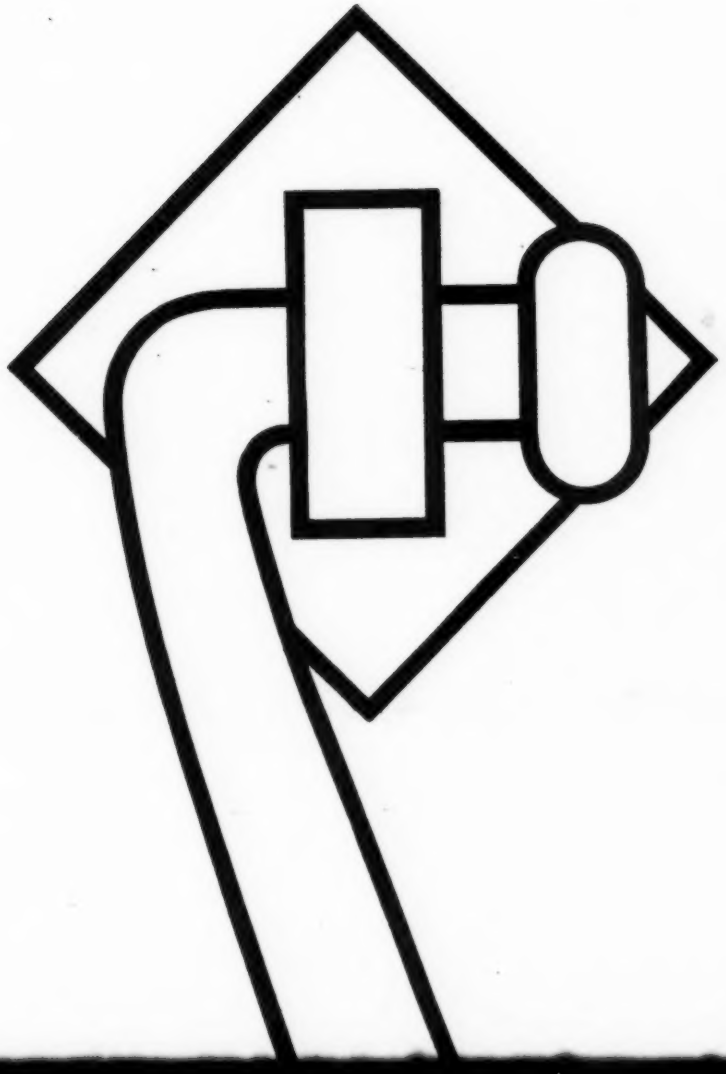

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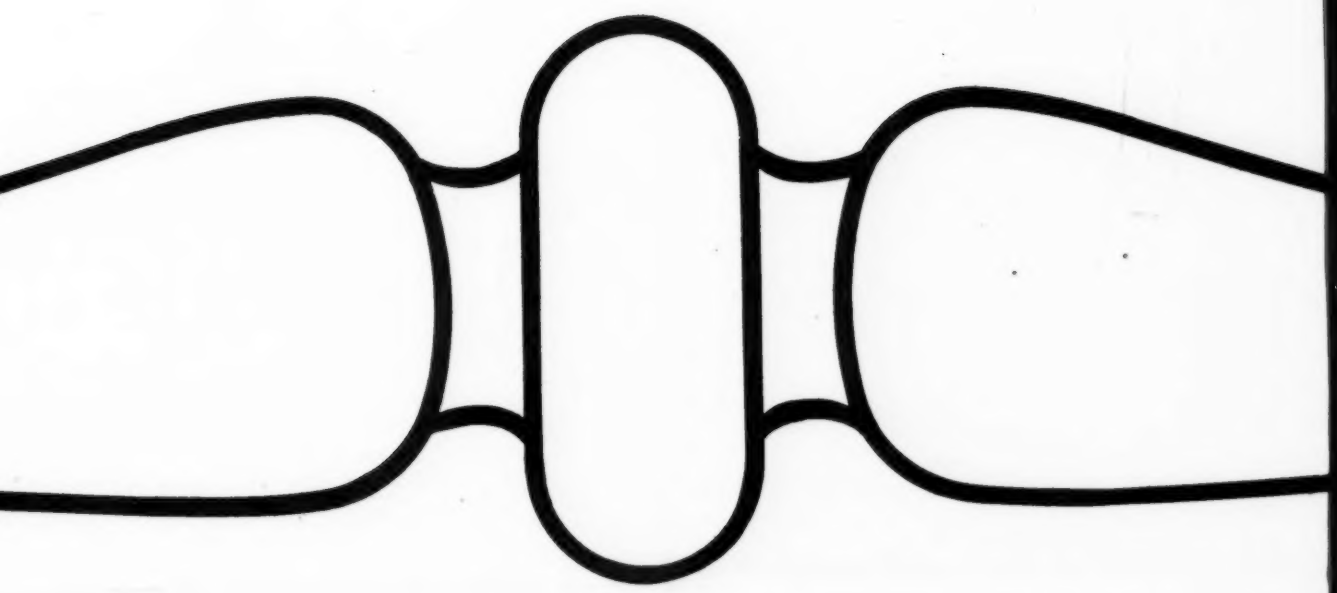

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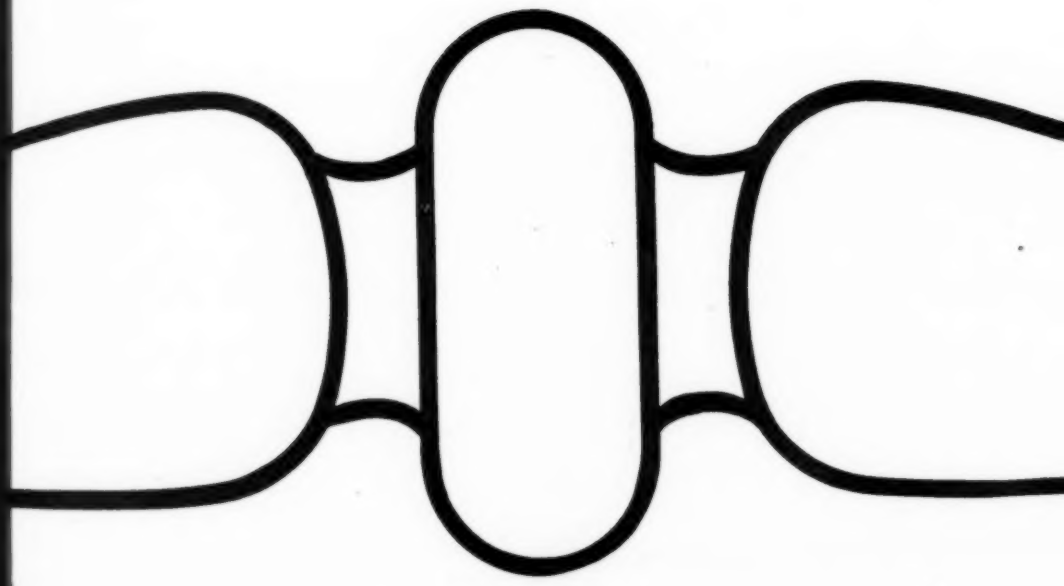

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